COMSPHERE 3821*PLUS* MODEM

USER'S GUIDE

Document No. 3821-A2-GB20-30

February 1998

PARADYNE™

COMSPHERE
3821*Plus* Modem

User's Guide
3821-A2-GB20-30

4th Edition (February 1998)

Changes and enhancements to the product and to the information herein will be documented and issued as a new release or a limited revision of this manual.

For the 3821*Plus* modem the USOC for Permissive mode is RJ21X. The Canadian equivalent to the USOC is CA21A. For single line connection to an analog private line, an adapter cable should be used to facilitate connection to a JM8 jack. The Canadian equivalent is CA40A.

FCC Registration number:	(See label on modem)
Ringer Equivalence number (REN):	(See label on modem)
Canadian Certification number:	(See label on modem)
Canadian DOC Load number:	(See label on modem)

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   In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:

   — Never install telephone wiring during a lightning storm.

   — Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

   — Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

   — Use caution when installing or modifying telephone lines.

   — Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

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Notices

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CET APPAREIL NUMÉRIQUE DE LA CLASSE A RESPECTE TOUTES LES EXIGENCES DU RÈGLEMENT SUR LE MATÉRIAL BROUILLEUR DU CANADA.

Government Requirements and Equipment Return

Certain governments require that instructions pertaining to modem connection to the public switched telephone network be included in the installation and operation manual. Specific instructions are listed in the following sections.

United States

Notice to Users of the Public Switched Telephone Network

1. This equipment complies with Part 68 of the FCC rules. On the circuit card is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment.
2. Page A of this manual contains the Universal Service Order Codes (USOC) associated with the services on which the equipment is to be connected.
3. The Ringer Equivalence (REN) is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the telephone company to determine the maximum RENs for the calling area.
4. If the modem causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.
5. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service.
6. If you experience trouble with this equipment, please contact your sales or service representative (as appropriate) for repair or warranty information. If the product needs to be returned to the company service center for repair, contact them directly for return instructions using one of the following methods:
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   - **Via Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.
     - — Within the U.S.A., call 1-800-870-2221
     - — Outside of U.S.A., call 1-727-530-2340

   If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.
7. The user is not authorized to repair or modify the equipment.
8. This equipment cannot be used on public coin service provided by the telephone company. Connection to Party Line Service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporation commission for information.)
9. The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via a telephone fax machine unless such a message clearly contains, in a margin at the top or bottom of each transmitted page, or on the first page of the transmission, the date and time it is sent, and an identification of the business, or other entity, or other individual sending the message, and the telephone number of such business, or other entity, or individual.

   In order to program this information, follow the steps outlined in the manual supplied with your fax software.
10. An FCC compliant telephone cord with modular plugs may be provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant.

Canada

Notice to Users of the Canadian Public Switched Telephone Network

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone line and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

The Load Number for this equipment is listed on a label on the modem. The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all devices does not exceed 100.

CAUTION

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

If your equipment is in need of repair, refer to page A in the front of this document for contact information.

United Kingdom

Ringer Equivalence Number

The Ringer Equivalence Number (REN) is a customer guide indicating approximately the maximum number of items of apparatus that should be connected simultaneously to the telephone line. The sum of the RENs should not exceed four. This value includes any BT-provided instrument which may be assumed to have a REN of 1 unless marked otherwise. The REN of this modem is 1.

Connection to Leased Lines

If any other apparatus, including cable or wiring, is connected between the apparatus and the point of connection to any speechband circuit, then all that other apparatus shall comply with the following:

1. The overall transmission characteristics of all that other apparatus shall be such as to introduce no material effect upon the electrical conditions presented to one another by the apparatus and the speechband circuit; and
2. All that other apparatus shall comprise only:

   (i) apparatus approved for the purpose of connection between the apparatus and a speechband circuit; and

   (ii) cable or wiring complying with a code of practice for the installation of equipment covered by this part of BS 6328 or such other requirements as may be applicable.

This modem is suitable for connection to BT circuits with signalling at a nominal frequency of 2280 Hz and may be connected to multipoint or point-to-point circuits. The apparatus does not require signalling or otherwise use the frequency range 0–200 Hz.

No d.c. interaction is intended between the modem and the telephone network.

This apparatus may be directly connected to a speechband circuit or connected to a relevant branch system for speechband circuits.

All European Countries

Safety Notice

Interconnection circuits between this modem and any other equipment should be such that the equipment continues to comply with the requirements of EN41003 for TNV (Telephone Network Voltage) circuits and EN60950 for SELV (Safety Extra Low Voltage) circuits after making connection between circuits.

Japan

Notices

この装置は，商工業地域で使用されるべき第一種情報装置です。住宅地域又はその隣接した地域で使用するとラジオ，テレビジョン受信機等に受信障害を与えることがあります。　ＶＣＣＩ－１

This equipment is classified in the 1st Class category. When used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. VCCI-1

Restrictions

Due to JATE (Japan Approvals Institute for Telecommunications Equipment) regulations, only 3 attempts to dial a number are permitted in a 3-minute period. If a fourth attempt is made to dial the same number, the modem returns the ERROR return code. This restriction applies to the number dialed from the command line or from a directory. An occurrence of the restriction is canceled when a different number is dialed, or when 3 minutes have elapsed.

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Preface

Objectives and Reader Assumptions

This guide describes how to install the 3821*Plus* circuit card and operate the 3821*Plus* modem. It is intended for all users of the 3821*Plus* modem.

Each 3821*Plus* card comprises three modems. In general this guide refers to the **3821*Plus* modem** with regard to operation and the **3821*Plus* card** with regard to installation. The term 3800*Plus* refers to all the modems in the 3800*Plus* series, including the 3810*Plus*, 3811*Plus*, 3820*Plus*, 3821*Plus*, and 3825*Plus*.

How to Use This Manual

Chapter 1 provides information about 3821*Plus* hardware and software features, including the front panel and status indicators.

Chapter 2 provides instructions for installing the card, selecting factory configuration options, recovering the ability to use AT commands, and using AT command initialization strings.

Chapter 3 shows the options menus available from the Shared Diagnostic Control Panel (SDCP).

Chapter 4 provides instructions for displaying and changing AT commands and S-registers. These commands control all aspects of the modem's operation.

Chapter 5 provides general information about fax modem operation.

Chapter 6 shows how to use the SDCP of a COMSPHERE modem to access and control a remote 3800*Plus* modem.

Chapter 7 describes the security features of the 3821*Plus* modem, including AT commands and SDCP controls used to set security configuration options.

Appendix A shows the menu trees available from the SDCP.

Appendix B lists result codes produced by the modem.

Appendix C provides instructions for performing diagnostic tests when data communications problems occur, and explains the Automatic Firmware Download process.

Appendix D lists the technical specifications of the 3821*Plus* modem.

Appendix E provides cable pin assignments.

Appendix F provides V.25bis dialing information.

Appendix G provides an equipment list.

Appendix H shows configuration options whose validity or default values vary according to country code.

The Glossary provides a description of terms used throughout this guide.

Related Documents

3000-A2-GA31	*COMSPHERE 3000 Series Carrier Installation Manual*
3980-A2-GB30	*COMSPHERE 3800Plus Modems, User's Guide*
6700-A2-GY31	*COMSPHERE 6700 Series Network Management System, User's Guide*
6800-A2-GE26	*COMSPHERE 6800 Series Network Management System, User's/System Administrator's Guide*

Call your sales representative to order additional product documentation.

Introduction 1

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Overview

The 3821*Plus* is a member of the COMSPHERE 3800 Series Modem product line. The 3821*Plus* card comprises three modems, permitting as many as 48 modems to be installed in a single 3000 Series Carrier. Each is a software-definable high-speed modem that offers reliable asynchronous and synchronous operation over dial or two-wire leased-line networks.

Features

The 3821*Plus* modem has a wide variety of features, including:

- Dial-Line Modulations: ITU-T V.34 (up to 33,600 bps), V.32*terbo* (19,200 and 16,800 bps), ITU-T V.32bis (up to 14,400 bps), V.32 (up to 9600 bps), V.22bis (2400 bps), V.22 (1200 bps), V.21 (300 bps), Bell 212A (1200 bps), and Bell 103J (300 bps).
- Two-wire Leased-Line Modulations: ITU-T V.34 (up to 33,600), V.32*terbo* (19,200 and 16,800 bps), V.32bis (14,400, 12,000, 9600, 7200, and 4800 bps), V.32 (9600 and 4800 bps), and V.22bis (2400 bps).
- Class 1 and Class 2 Group III Fax modulations: ITU-T V.17 (14,400, 12,000, 9600, 7200 bps), V.29 (9600, 7200 bps) and V.27ter (4800, 2400 bps).
- Convenient migration to new or optional features through software downloading.
- ITU-T V.42bis and MNP Class 5 data compression.
- Virtual error-free data integrity with ITU-T V.42 and MNP Levels 2–4 error control.
- Asynchronous dial DTE data rates from 300 bps to 115,200 bps.
- Optional Enhanced Throughput Cellular (ETC), which improves reliability and speed over cellular links.
- Compatibility with the industry de facto standard AT Command set.
- High-speed transmission using asynchronous, synchronous, or UNIX devices over full- or half-duplex dial networks or 2-wire leased lines.
- Supported under the COMSPHERE 6700 or 6800 Series Network Management System (NMS).
- Compatibility with standalone COMSPHERE 3800*Plus*, 3800, and 3900 Series modems' Remote Access Mode, which allows users to view the configuration options of a 3821*Plus* modem from a remote Diagnostic Control Panel (DCP) or Shared Diagnostic Control Panel (SDCP).

- Storage of up to 10 telephone numbers to directory locations.
- Originate Security and three Answer Security modes.
- Callback Security with telephone directory index or telephone number.
- Two factory-defined configurations and two user-defined configuration areas.

Status Indicators

The status indicators on a 3821*Plus* circuit card continuously provide information on the modem's operating condition. The status indicators for the 3821*Plus* card are located on its faceplate, the SDCP, and the Shared Diagnostic Unit (SDU) faceplate (Figure 1-1).

The 3821*Plus* card has 13 Light Emitting Diodes (LEDs). These LEDs are listed and described in Table 1-1.

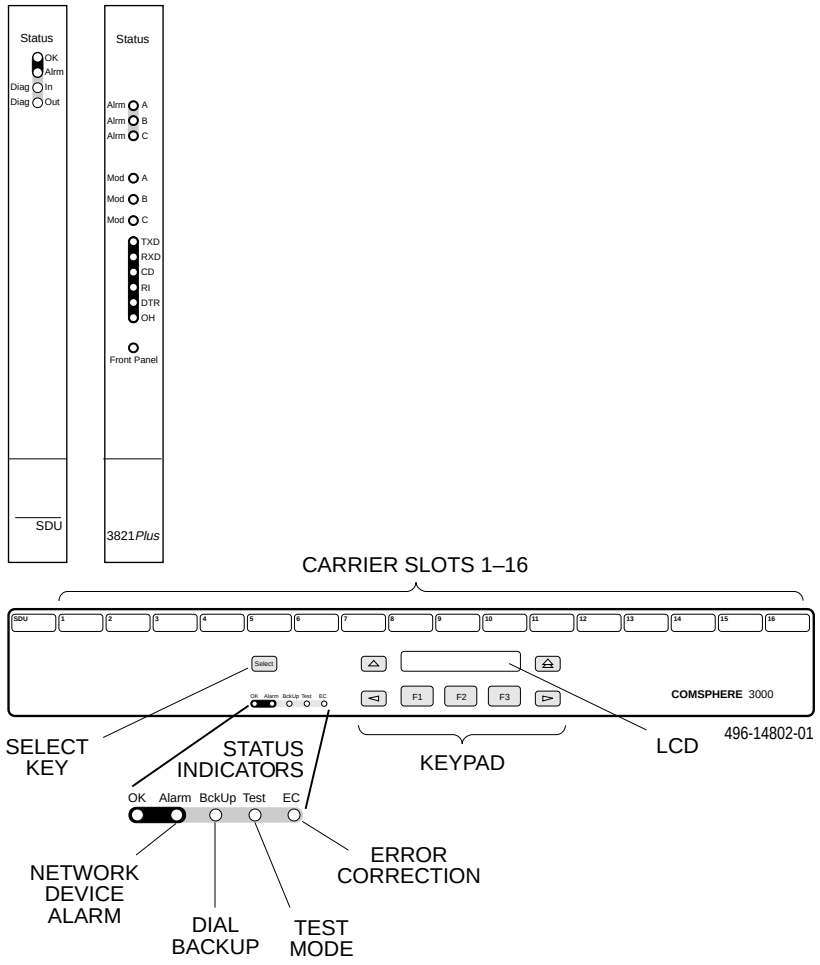

Figure 1-1. Optional SDCP, 3821*Plus* Faceplate, and Optional SDU

Table 1-1
3821*Plus* LEDs

Label	Color	Indicates
ALRM A	red	Alarm A ON: Modem A has detected a problem with its operation.
ALRM B	red	Alarm B ON: Modem B has detected a problem with its operation.
ALRM C	red	Alarm C ON: Modem C has detected a problem with its operation.
Mod A	green	Modem A ON: The status of Modem A is reflected by the TXD, RXD, CD, RI, DTR, and OH LEDs. If the Front Panel LED is ON, Modem A is connected to the SDCP.
Mod B	green	Modem B ON: The status of Modem B is reflected by the TXD, RXD, CD, RI, DTR, and OH LEDs. If the Front Panel LED is ON, Modem B is connected to the SDCP.
Mod C	green	Modem C ON: The status of Modem C is reflected by the TXD, RXD, CD, RI, DTR, and OH LEDs. If the Front Panel LED is ON, Modem C is connected to the SDCP.
TXD	green	Transmit Data ON: The modem indicated by the A, B, or C LED is receiving data from the DTE to transmit. The TXD and RXD LEDs blink for 5 seconds after a modem is selected using NMS or the SDCP.
RXD	green	Receive Data ON: The modem indicated by the A, B, or C LED is transferring received data to the DTE. The TXD and RXD LEDs blink for 5 seconds after a modem is selected using NMS or the SDCP.
CD	green	Carrier Detect ON: The modem has detected a valid modulation carrier signal and is capable of transferring received data to the DTE.
RI	green	Ring Indicate Cycling ON and Off: The modem indicated by the A, B, or C LED is receiving a ring signal.
DTR	green	Terminal Ready ON: The DTE connected to the modem indicated by the A, B, or C LED has turned ON the DTR (Data Terminal Ready) signal, or the modem is configured to ignore DTR. Off: The DTR signal of the modem indicated by the A, B, or C LED is Off.
OH	green	Off-Hook ON: The modem indicated by the A, B, or C LED is off-hook and set for Dial. Off: The modem indicated by the A, B, or C LED is on-hook and set for Dial. Cycling ON and Off: The modem indicated by the A, B, or C LED is set for leased line operation.
Front Panel	amber	Front Panel ON: The SDCP is connected to the modem indicated by the A, B, or C LED.

SDCP Operation

The SDCP on the 3000 Series Carrier is the user interface to all functions used to configure and control the 3821*Plus* modem. This interface includes the status LEDs, and a two-line, 32-character Liquid Crystal Display (LCD) and keypad (Figure 1-2).

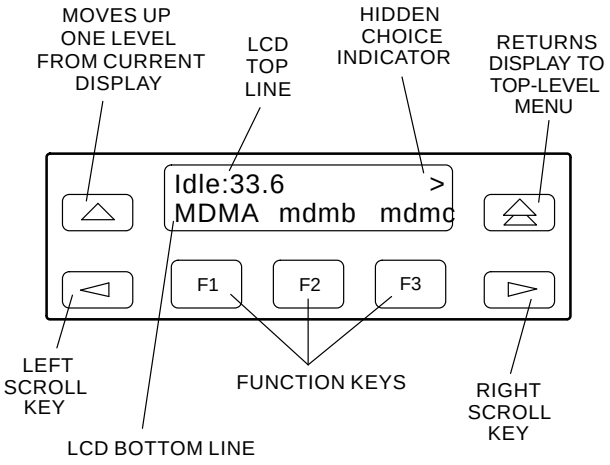

Figure 1-2. SDCP Keypad

LCD

The LCD consists of a top line and bottom line, with each displaying a maximum of 16 characters at a time. If additional information is available than what is currently displayed, a hidden choice indicator (< or ⇄ or >) appears in the upper right-hand corner of the LCD. The list of choices does not scroll around to the first choice when you reach the last choice. The ◅ and ▻ keys allow you to display the other choices.

If a local 3800*Plus* modem establishes a connection with a remote 3800*Plus* modem via the Remote branch, then ◘ appears in place of the hidden choice indicator on both modems.

Keypad

The SDCP of the COMSPHERE 3000 Series Carrier has eight keys.

⏢ *Key*

The ⏢ key returns you to the Top-Level menu display from anywhere in the menu tree.

Pressing ⏢ while changing configuration options displays the message **Save Straps? Yes No**. If **No** is selected, changes made to configuration options are not saved and the Top-Level menu appears. If **Yes** is selected, then changes are saved to either Active (Saved), Customer 1, or Customer 2 configuration areas.

△ *Key*

The △ key moves you up one level in the menu tree.

◅ *and* ▻ *Keys*

Use the ◅ and ▻ keys to move the viewing window left or right and to scroll the remaining branches and selections into view. A maximum of three selections can be displayed at one time.

These keys also allow you to move the cursor one character to the left or right on data entry displays; for example, to allow entry of one digit at a time.

F1, F2, F3 Keys

Function keys select the LCD choice that appears above the function key; they are labeled F1, F2, and F3. If a selection spans more than one function key, then any of those keys choose that selection.

Numerical Scroll Indicators ↑ ↓

To enter a number on the SDCP, such as a telephone number to be stored in the modem's directory, use the function keys F2 (↑) or F3 (↓). A displayed number is increased or decreased according to whether the key associated with the up arrow or the down arrow is pressed. In other applications, such as password entry, only the up arrow is displayed, and the displayed numbers can only be incremented.

Select *Key*

The Select key is used to connect the SDCP to a card in a specific slot in the carrier. The Front Panel LED of the 3821*Plus* card turns ON when the SDCP is connected to it.

3821*Plus* Modem Installation 2

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Overview

This chapter describes how to install the 3821*Plus* card and connect both provided and customer-supplied cables to the modems. In addition, it describes how to configure 3821*Plus* modems for specific applications.

3821*Plus* Installation

A typical 3821*Plus* installation requires the following equipment:

- Eight 3821*Plus* cards
- One DTE interface assembly with 24 ports
- One Network Interface Module (NIM) with a 50-position short ribbon cable
- This user's guide
- Three DTE (RS-232D) cables or three 8-position modular cables with six 8-position modular to DB25 adapters for each 3821*Plus* card
- One 50-position to network interface cable for each NIM
- A 66A-punchdown block or RJ11 gang box

See Appendix G, *Equipment List*.

If any hardware components are damaged, notify your sales representative. Return equipment using the procedures described in the *Government Requirements and Equipment Return* section in the front of this guide.

Install the Carrier

The 3821*Plus* card resides in a COMSPHERE 3000 Series Carrier. The carrier must be installed in a rack before the modem cards can be installed in the carrier.

The 3821*Plus* card requires a Shared Diagnostic Control Panel (SDCP) for control and configuration of individual modems. It also requires a Shared Diagnostic Unit (SDU) if the modems will be under control of an NMS, or if the SDCP is used for more than one carrier. Instructions for the installation of the SDCP and SDU, as well as the 3000 Series Carrier and its power supply, can be found in the *COMSPHERE 3000 Series Carrier Installation Manual*, document number 3000-A2-GA31.

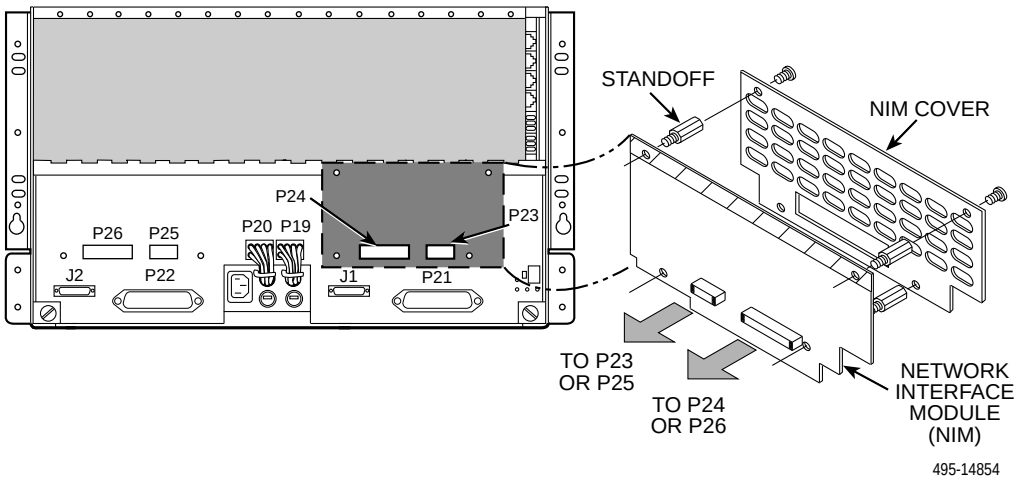


Figure 2-1. Installing the NIM

Install the NIM

A NIM can be installed on the left or right side of the back of the 3000 Series Carrier.

▶ Procedure

1. If you are installing a NIM on the right side of the carrier, press it onto the connectors P24 and P23. If you are installing a NIM on the left side of the carrier, press it onto the connectors P26 and P25.
2. Fasten the NIM to the carrier with the four standoffs provided. See Figure 2-1.
3. Position the NIM cover over the NIM.
4. Fasten the NIM cover in place with the four screws provided. See Figure 2-1.

Cable the NIM

Connect one end of the short ribbon cable to the 50-pin connector at the bottom of the NIM. Connect the other end to P21 (on the right side of the carrier) or P22 (on the left side of the carrier). See Figure 2-2.

Connect a network interface cable to the 50-pin connector in the middle of the NIM. Connect the other end to the dial or leased-line interface. This may be an RJ11 gang box or a 66A-punchdown block. Wiring for the 50-pin NIM cable is shown in Appendix E.

A 2-wire leased line connection to a JM8 interface requires a 6-position to 8-position crossover cable. See Appendix E.

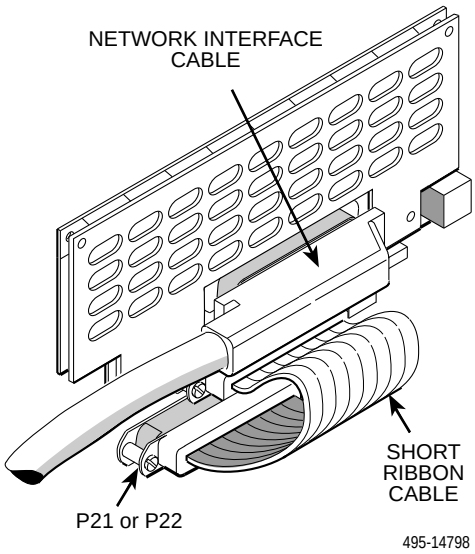


Figure 2-2. Cabling the NIM

Attach the DTE Interface Assembly

The eight-slot DTE interface assembly can be mounted on the left or the right side of the carrier. If you are installing only one interface assembly, it must be mounted on the same side you installed the NIM.

▶ Procedure

1. Feed the eight tabs at the bottom of the DTE interface assembly into the slots on the left or right side of the carrier.
2. Insert the screws provided, but **do not completely tighten them.** See Figure 2-3.

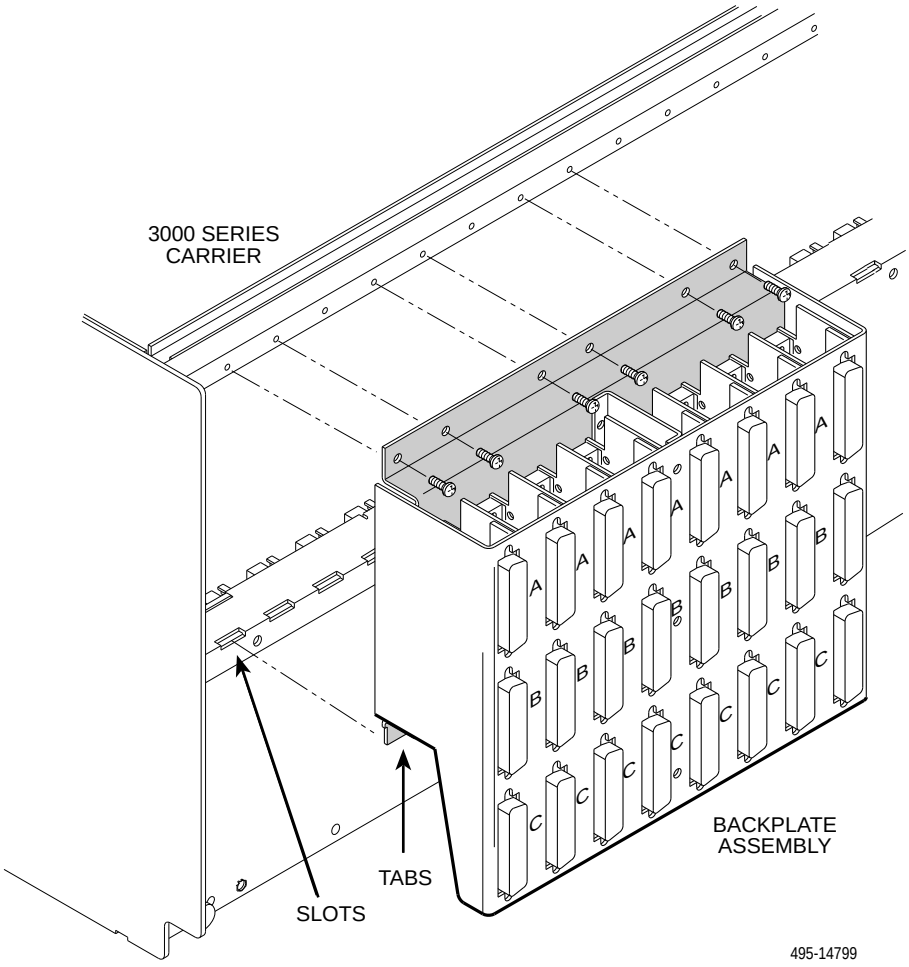


Figure 2-3. DTE Interface Assembly

Install the Circuit Card

Slide the 3821*Plus* card into its slot in the 3000 Series Carrier. Press firmly until the back edge of the card seats in the socket of the DTE interface assembly.

Figure 2-4 shows circuit cards in a carrier in which the NIM and DTE interface assembly were installed on the right side of the backplane.

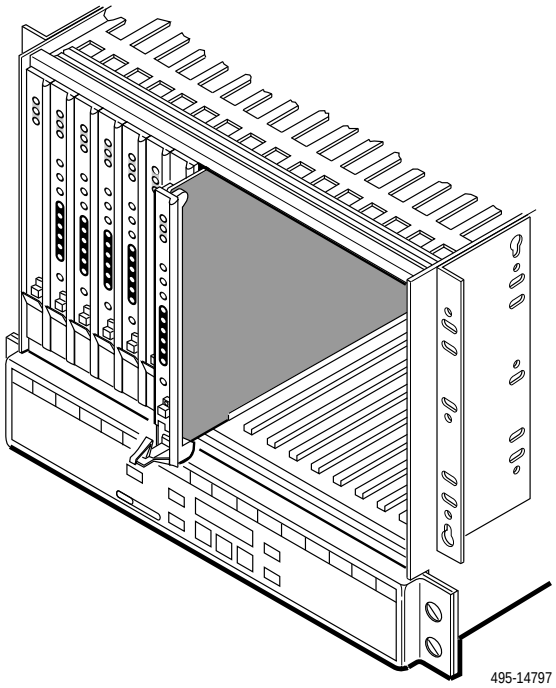


Figure 2-4. Installing the Card Into the Carrier

▶ Procedure

1. Turn the circuit pack lock until it is vertical, locking the 3821*Plus* card in place. See Figure 2-5.
2. When all cards are installed and locked in place, tighten the screws on the DTE interface assembly.

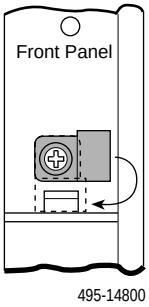


Figure 2-5. Circuit Pack Lock

Connect the DTE

To connect the DTE to the modem, you can use two DB25 to 8-position modular adapters and an 8-pin RJ45-type modular cable instead of an RS-232 cable with DB25 connectors. Because of the large number of cables required for typical 3821*Plus* installations, the slimmer modular cable is recommended.

The connectors on the DTE interface assembly are labeled, from top to bottom, **A**, **B**, and **C**. These markings show which modem on a card is associated with each connector.

▶ Procedure

1. Connect the DB25 adapter or the connector on an RS-232 DTE cable to one of the DB25 connectors on the DTE interface assembly. Use a small screwdriver to fasten the connector to the backplate.
2. Connect the DB25 adapter or connector on the cable to the DB25 connector on the DTE. Use a small screwdriver to fasten the cable to the DTE.

Install Communications Software

A computer commands and controls a modem through communications software. This software uses the AT command set to send instructions to the modem. A dumb asynchronous terminal, however, does not require this software since it can directly send AT commands.

The 3821*Plus* can be used with any major communications software. Refer to your software's user's guide for installation procedures. For an overview of how to use AT commands and a list of AT commands supported by the 3821*Plus*, refer to Chapter 4, *AT Commands and S-Registers*.

Select Factory Configuration Options

After the modem passes the power-up self-test, configure it for operation using one of the factory preset configurations.

The 3821*Plus* modem has several factory preset templates that contain the most commonly used configuration options (straps) for

- Asynchronous Dial (shown as **Async Dial** on the SDCP)
- Synchronous Dial (**Sync Dial**)
- Synchronous Leased (**Sync Leased**, **Answer** or **Originate** mode)
- UNIX hardware network (**UNIX Dia**l)

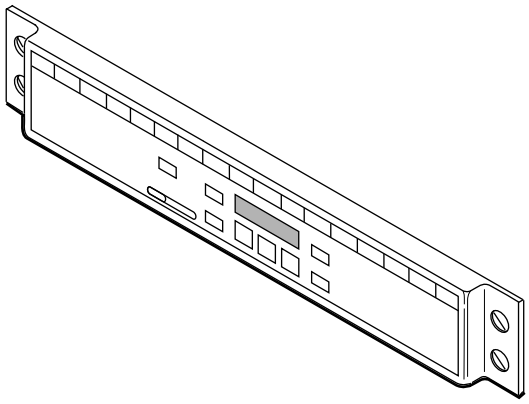
If ETC is installed:

- Cellular mobile (**Cellular(Mobile)**)
- Cellular PSTN (**Cellular(PSTN)**)

Your modem is shipped from the factory with the Async Dial default configuration options stored in memory. If Sync Dial, Sync Leased, UNIX Dial, or Cellular is more appropriate for your configuration, then you must change the factory setting using either the SDCP or the AT command set as described in the following sections.

The preset configuration gives you a "head start" in getting your modem operating and reduces the amount of time required to configure your modem. For a better understanding of SDCP operation and factory preset configuration options, refer to *Configure Branch* in Chapter 3.

Selecting Configurations Using the SDCP



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The SDCP's Liquid Crystal Display (LCD) consists of two 16-character lines which display modem status, control functions, and configuration options as well as indicating your location in the Top-Level menu tree (Appendix A).

To change the factory template for each modem using the SDCP, perform the following steps:

▶ Procedure

1. At the top level of the menu structure, select Modem A, B, or C by pressing F1, F2, or F3.
2. Press the ▻ key until **Configure** comes into view.
3. Press the function key below Configure to select the Configure branch.

   The LCD now displays **Ld EditArea frm.**
4. Press the ▻ key until **Factory** comes into view. Press the F1 key to display the factory preset configurations.

   Factory preset configurations are **Async Dial, Sync Dial, Sync Leased**, **UNIX Dial**, and, if ETC is installed, **Cellular(Mobile)**, and **Cellular(PSTN)**. If Sync Leased is selected, you must choose either **Answer** or **Originate** mode.

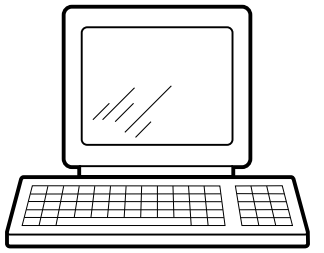
5. Press the ▻ key until the appropriate factory preset appears on the LCD, and press the corresponding function key to select your choice.
6. **Choose Function** appears and displays the Edit and Save functions.
7. Press the F3 key (Save) to save the new factory preset configuration to one of three configuration areas, **Active (Saved), Customer 1**, or **Customer 2**.

   (These three configuration areas are nonvolatile memory locations. Active (Saved) contains the most recently saved changes to any configuration options. In the event of power loss, the modem retrieves these configuration options. Customer 1 and Customer 2 are user-defined configuration areas.)

   The LCD now displays **Sav EditArea to**.
8. Press the ▻ key until the appropriate configuration area appears on the LCD, then press the corresponding function key to select your choice. (Saving configuration options to the Active (Saved) configuration area automatically saves them to the Active (Operating) configuration area.) The LCD displays **Command Complete**.
9. The modem is now configured with the selected factory template. Press the ⏏ key to return to the Top-Level menu.

Refer to *Configure Branch* in Chapter 3 for more information regarding default factory configuration options.

Selecting Configurations Using AT Commands



When using AT commands, the following criteria must be met:

- Make sure the asynchronous DTE's communication software is configured for 10-bit character format (for example, 8 data bits, no parity, and 1 stop bit).
- Make sure the DTE (RS-232D) cable is attached to the DTE connector at the rear of the COMSPHERE 3000 Series Carrier, and to the correct serial communications port on the asynchronous DTE.
- On initial power-up, the modem is in Command mode. To verify that the modem is connected and functioning properly, enter the following:

  TYPE: AT

  PRESS: Return (Enter)

  The screen displays **OK.**

If the modem does not return **OK**, refer to Appendix C, *Troubleshooting*.

NOTE

If you have already changed the factory preset configuration you may have lost AT command control. To regain AT command control, select, via the SDCP, the Async Dial factory preset configuration as described earlier in *Selecting Configurations Using the SDCP.*

To change a factory template using AT commands, perform the following steps (for more information on changing factory templates using AT commands, refer to Chapter 4, *AT Commands and S-Registers*).

▶ Procedure

1. Use the AT&F&W command to load the appropriate factory configuration to the appropriate storage area. Enter the following:

   TYPE: AT&F*y*&W*n*

   Where: *y* is one of the following Factory configurations:

   0 for Async Dial
   1 for Sync Dial
   2 for Sync Leased (Answer)
   3 for UNIX Dial
   4 for Sync Leased (Originate)
   5 for Cellular (Mobile)
   6 for Cellular (PSTN)

   (NOTE: &F1, &F2, and &F4 remove AT command control. The only way to return to AT command control is through the SDCP as described earlier in *Selecting Configurations Using the SDCP.* &F5 and &F6 are available only if ETC is installed.)

   and

   Where: *n* is one of the following storage areas:

   0 for Active (Saved)
   1 for Customer 1
   2 for Customer 2

   (NOTE: These three configuration areas are nonvolatile memory locations. Active (Saved) contains the most recently saved changes to any configuration options. In the event of power loss, the modem retrieves these configuration options. Customer 1 and Customer 2 are user-defined configuration areas.)

   PRESS: Return (Enter)

2. The selected factory configuration is saved.

The &V (View) command can be used to display the configuration options in effect. The output of the &V command can be saved to a file and printed (using your communications software), providing both a record of your configuration and a worksheet for configuration enhancements. Refer to Chapter 4, *AT Commands and S-Registers*, for more on AT commands.

> **NOTE**
>
> When configuring your modem, keep a record of its configuration options as a future reference in case the modem must be replaced.

To establish a connection with a remote modem, use the D (Dial) command. Refer to Chapter 4, *AT Commands and S-Registers*, for more information.

SDCP Menus 3

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Menu Structure

An elaborate menu of options is available from a Shared Diagnostic Control Panel (SDCP).

The menu tree is a hierarchical structure used to display functions that configure and control local and remote 3821*Plus* modems. It is accessed via the SDCP and is shown in its entirety in Appendix A.

The menu tree contains the following branches:

Modem Select — Used to select one of the three modems on the card. The modem shown in uppercase characters is the modem connected to the SDCP.

Quick Configuration Display — This hidden menu item displays information about the modem's configuration, such as line mode and rate.

Call Setup — Used to dial, disconnect, and answer telephone calls as well as store up to 10 telephone numbers in directory locations.

Status — Used to monitor the current status of the VF line and DTE interface as well as view the identity of the modem.

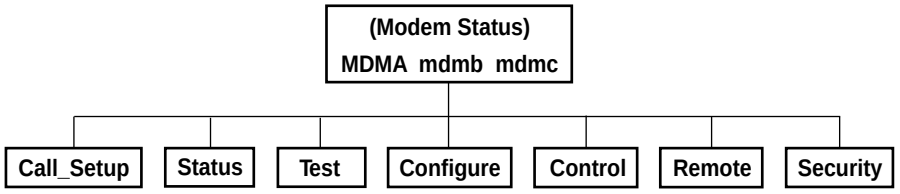
Test — Used to begin and end various modem tests.

Configure — Used to change and save the modem's configuration options.

Control — Used to control the modem's hardware and software functions.

Remote — Used to access and control a remote 3800*Plus* modem. See Chapter 6, *Remote Access*.

Security — Used to control the modem's dial access security. See Chapter 7, *Security*.



Modem Status Messages

Access to all menu tree branches from the SDCP begins at the Top-Level menu, the head of the menu hierarchy. The LCD's top line identifies the modem status, as listed in Table 3-1, while the bottom line displays the main menu tree branches and operational and dial access security messages, as listed in Table 3-2 and Table 3-3.

Messages listed in Table 3-2 are common operational messages that occur during modem operation. These messages normally appear on the second line of the LCD.

Messages listed in Table 3-3 are dial access security messages that can occur when the optional security feature is installed.

The Top-Level menu's main branches appear on the LCD in the order of Modem Select, Call Setup, Status, Test, Configure, Control, Remote, and Security.

Table 3-1
(1 of 3)
Top-Level Menu Status

Normal Operation Status Message	Indicates
Idle:*MR**	The modem is configured for dial network operation and is on-hook.
Leased:*MR**	The modem is operating on leased lines at the displayed data rate.
OnLine:*MR* EC***	Indicates the modem is online, in Data mode, and operating at the displayed data rate. EC (error control) displays if error control is operational.
Fax Tx:*MR**	The modem is transmitting a fax on a dial line.
Fax Rx:*MR**	The modem is receiving a fax on a dial line.
Ring Indicate	The local modem is receiving an incoming ring.
Test:*MR**	The modem is in test mode operating at the displayed data rate.
Alarm Status Message***	**Indicates**
Make Busy	Indicates the modem is in a Make Busy condition.
Power On Fail	Indicates the modem has failed its Power-On Self-Test.
Self Health Fail	Indicates a failure in the modem's hardware components.

*MR – Modem Rate indicates the data rate the modem is using, in bits per second. One of the following values appears: 300, 1200, 2400, 4800, 7200, 9600, 12K (12,000), 14.4 (14,400), 16.8 (16,800), 19.2 (19,200), 21.6 (21,600), 24K (24,000), 26.4 (26,400), 28.8 (28,800), 31.2 (31,200), or 33.6 (33,600).

**EC – Error Control indicates the modem is online and using V.42 or MNP error control. One of the following values appears after the modem rates listed above: MNP2, MNP3, MNP4, MNP5, V42, V42b, V42t (SDC) or NoEC. (NoEC indicates the modem is connected in Buffer mode rather than error control. If an EC value does not appear, then the modem is in Direct mode.)

*** The Alarm Status Messages only appear when the Normal Operation Status Messages are displayed; the LCD alternates between the two message sets.

Table 3-1
(2 of 3)
Top-Level Menu Status

Normal Call Setup Messages	Indicates
Off Hook	The modem is off-hook and waiting to dial a telephone number.
Dialing	The remote modem is being dialed.
Training	The modem is training or retraining.
EC Negotiating	The local and remote modems are negotiating the highest possible level of error control compatible between both modems. Once a level is selected, this LCD message disappears.
Call Failure Messages	**Indicates**
Busy Signal	The answering modem is busy.
Delayed Number	As a result of failed call attempts, this number may not be called at this time. Try again later. (Only appears in countries where the number of repeated call attempts is limited.)
Dial Line in Use	The modem is already operating on dial networks when another call attempt has been issued.
Forbidden Number	As a result of failed call attempts, this number may not be called again. (Only appears in countries where the number of repeated call attempts is limited.)
Invalid Number	The modem has attempted to dial from a directory location that has no phone number.
No Answer Tone	No answer tone has been received within the time limit specified by the No Answer Timeout configuration option. The network tones (if any) could not be interpreted by the modem.
No Dial – DTR	The modem cannot dial because DTR is Off.
No Dial – Test	The modem cannot dial because it is running a Test.
No Dial Tone	The modem has aborted the call because it cannot detect a dial tone.
No Quiet Answer	The modem has detected No Quiet Answer (@) before the time-out setting of the No Answer Disconnect configuration option.
Ringback Timeout	The answering modem has not answered within the time limit specified by the No Answer Timeout configuration option; a ringback signal was detected.
Wrong Call	The call was answered, but not by a modem; there was no answer tone.
Call Disconnect Messages	**Indicates**
ATH Disconnect	The modem has disconnected due to an ATH command.
Bad Lines Disc	The modem has disconnected because the lines do not support the modulation and/or data rate selected.
No Carrier Disc	The modem disconnects due to the loss of carrier signal from the remote modem.
DTR Disconnect	The modem has disconnected due to the loss of DTR from the DTE.
EC Disconnect	The modem has disconnected due to failure to negotiate Error Control mode.

Table 3-1
(3 of 3)
Top-Level Menu Status

Call Disconnect Messages, continued	Indicates
LongSpace Disc	The modem has disconnected due to the detection of a long space.
NoData Disc	The modem has disconnected due to a lack of transmitted and received data.
Disconnecting	The modem has begun the disconnect sequence.
Rmt Cmnded Disc	The modem has disconnected due to a V.32 or V.34 Cleardown received from the remote modem.
Firmware Download Result Messages	**Indicates**
DownldOnly Mode	Indicates that a local download of firmware or a remote cloning of firmware has failed. The modem is currently in a Download Only mode in which only another download attempt is possible.
Frmware Upgrade	Indicates that a local download of firmware or a remote cloning of firmware was successful.
RemClone Failed	Displays on the local modem's LCD and indicates that a remote cloning of firmware has failed.
Remote Clone OK	Displays on the local modem's LCD and indicates that a remote cloning of firmware was successful.
AT Command Reset Message	**Indicates**
Reset by AT command	The modem has performed a reset in response to an ATZ command.

Table 3-2
Common Operational Messages

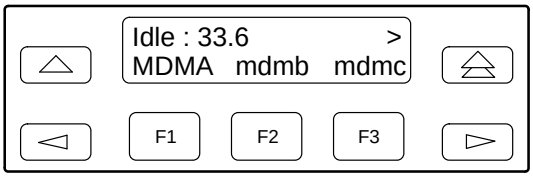
Common Operational Messages	Indicates
Please Wait...	Appears when a command to a local device takes more than two seconds to complete.
Command Sent...	Appears when a command is sent to a remote modem.
No Rem Response or Remote Modem Fail	Appears when a remote modem does not respond to a command within 5 seconds.
Command Complete	Appears when a command, issued to a local or remote modem, is completed.
Invalid Command	Appears when the modem cannot complete a command.

Table 3-3
Dial Access Security Messages

Dial Access Security Messages	Indicates
Get VF PsWd	The answering modem is waiting for the originating caller to transmit a VF password.
Get DTE PsWd	The answering modem is waiting to receive a valid DTE password from the remote DTE.
VF PsWd Timeout	The modem did not finish answering a call (disconnected) because the allowed time limit was exceeded before the modem received a VF password from the originating dialer.
Unknown DTEpswd	The modem did not finish answering a call (disconnected) because the DTE passwords received from the remote DTE were invalid.
No Orig PsWd	The modem did not attempt to establish a call as requested because the AT dial command did not contain an originate access password.
Unknown VF PsWd	The modem did not finish answering a call (disconnected) because the modem received an invalid VF password.
DTEpswd Timeout	The modem did not finish answering a call (disconnected) because the allowed time limit was exceeded before the modem received a DTE password from the remote DTE.
Inval Orig PsWd	The modem did not attempt to establish the call as requested because the originate password in the AT dial command was not valid.
DTR Dial Blocked	Appears if DTR dialing is used and Answer Access or Originate Access security is enabled. DTR dialing is not permitted when security is enabled.
SecurityBlocked	Appears only when the modem is in base mode (a mode that occurs during a firmware download) and Answer Access Security is enabled. In this case, the access verification capabilities are not available and the modem does not pass data to the DTE under any circumstances.

Modem Select Branch

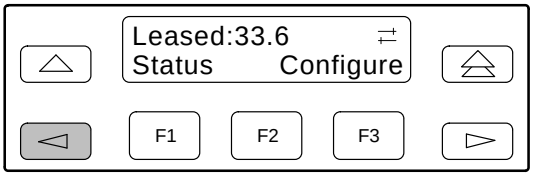
The Modem Select branch is the top level of the menu structure. The modem selections are displayed when the SDCP is first connected to a 3800*Plus* card (using the Select key on the SDCP).



Press F1, F2, or F3 to connect the SDCP to modem A, B, or C, respectively. The connected modem appears on the SDCP in all uppercase characters.

Quick Configuration Display

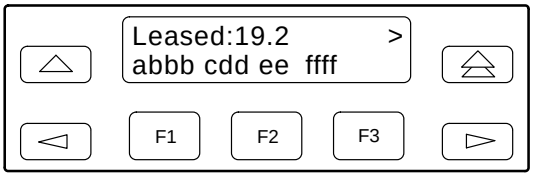
The Quick Configuration display indicates the basic operational characteristics of the modem.



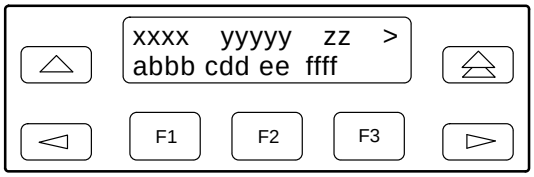
The modem's Quick Configuration information appears on the LCD's bottom line.

To access the Quick Configuration display from the Top-Level display, press the ◁ key. Based on the configuration of the modem, one of two screens appears.

If the modem is not operating with V.34 modulation, the following screen appears.



If the modem is operating with V.34 modulation, the following screen appears.



The V.34 modulation Quick Configuration information appears on the LCD's top line.

NOTE

In Dial mode, where Automode automatically adapts to the modulation scheme of the remote modem, the V.34 Quick Configuration display may not necessarily indicate the actual (V.34) online modulation.

For more information on V.34, refer to the *V.34* section in this chapter.

The following provides information about the Quick Configuration LCD display.

a Displays the network position of the modem. The letter **C** indicates this is a control modem, and **T** indicates this is a tributary modem.

bbb Displays the network management address of the modem. The valid address field range is from 001 to 256.

c Displays the DTE mode. The letter **A** indicates the currently selected port is in Asynchronous mode, and **S** indicates the currently selected port is in Synchronous mode. If the NMS channel is selected, the letter in this location (**A** or **S**) will indicate the status of Port 1. (The NMS channel is always in Asynchronous mode.)

dd Displays the line mode. The letters **LA** indicate Leased Answer mode, **LO** indicate Leased Originate mode, and **D** indicates Dial mode.

ee Displays the DTE port. For the 3821*Plus* modem, this is always P1.

ffff Displays the modem's modulation scheme as shown below:

V34	indicates V.34 family modulation.
V32t	indicates V.32*terbo* modulation.
V32b	indicates V.32bis modulation.
V32	indicates V.32 modulation.
V22b	indicates V.22bis modulation.
V27b	indicates V.27bis modulation.
V33	indicates V.33 modulation.
V29	indicates V.29 modulation.
V22	indicates V.22 modulation.
V23	indicates V.23 modulation.
V21	indicates V.21 modulation.
212A	indicates Bell 212A modulation.
103J	indicates Bell 103J modulation.

xxxx Modem Transmit Rate indicates the rate at which the modem is transmitting data. Possible values are 2400, 4800, 7200, 9600, 12.0 (12,000), 14.4 (14,400), 16.8 (16,800), 19.2 (19,200), 21.6 (21,600), 24.0 (24,000), 26.4 (26,400), 28.8 (28,800), 31.2 (31,200), or 33.6 (33,600) bps.

yyyyy Symbol Rate indicates the baud rate used by V.34 modulation. Refer to ITU specifications. Possible values are 3429, 3200L, 3200H, 3000L, 3000H, 2800L, 2800H, 2743L, 2743H, 2400L, 2400H.

zz Transmit Level indicates the power level at which the modem is transmitting when running V.34 modulation. Possible values are 01–64 dBm.

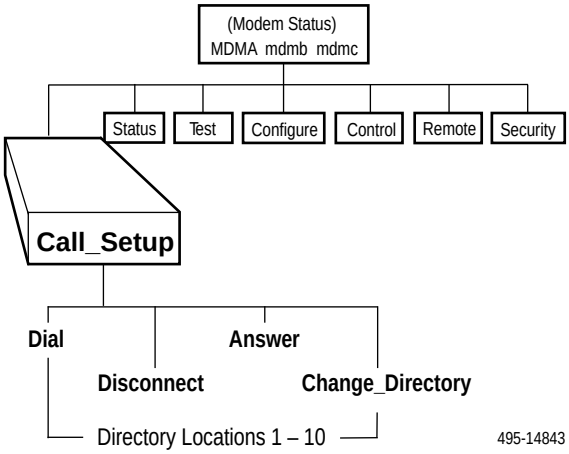
To exit the Quick Configuration function and return to the Top-Level menu, press the ▷ , △ , or ⏎ key.

Call Setup Branch

The Call Setup branch of the Top-Level menu allows you to dial, disconnect, and answer telephone calls. It also allows you to create and store up to 10 telephone numbers to directory locations. Four different functions can appear under Call Setup:

- Dial
- Disconnect
- Answer
- Change Directory

To access Call Setup from the Top-Level menu, press the ▻ key once. Select Call_Setup.



Dial

Dial allows you to dial any telephone number stored in directory locations 1–10. Any telephone number dialed using the SDCP must already exist in a directory location. Refer to *Change Directory* for information on storing telephone numbers in directory locations.

To dial a number from the Call Setup branch, make the following selections:

1. Select Dial by pressing F1. The first directory telephone number is displayed.
2. To view other directory locations, select Nxt.
3. Once the directory location you want appears on the LCD, press the F2 or F3 key to dial the number.

If the connection is successful, the modem is online and one of the Normal Operation status messages appears on the LCD. If the connection is not successful, the LCD displays one of the Call Failure status messages. See Table 3-3.

If DTE dialing is enabled and any character is received from the DTE before the modem goes online, the dial sequence is aborted. This is known as any-key abort.

Disconnect

Disconnect allows the modem to go on-hook (hang up). Use this function when you want to disconnect an established call on a dial line.

To access Disconnect from the initial screen of Call Setup branch, press F2 or F3 to select Disconnect.

The modem goes on-hook (hangs up) and the call is disconnected. This includes any calls being used for dial backup of leased lines. The **Command Complete** status message is displayed.

To exit this function and remain in the Call Setup branch, press the △ key. To exit and return to the Top-Level menu, press the ⏫ key.

Answer

Answer allows the modem to go off-hook, generate an answer tone, and begin the handshaking process with the calling modem. Use the Answer function when the Auto-Answer Ring Count configuration option is disabled. (See the *Line Dialer* group under *Configure Branch*.)

To access Answer from the Call Setup branch, make the following selections:

1. Press the ▻ key until Answer is displayed.
2. Select Answer.

The modem goes off-hook and attempts to establish a connection in Answer mode. The **Command Complete** status message appears on the LCD.

To exit this function and remain in the Call Setup branch, press the △ key. To exit and return to the Top-Level menu, press the ⏫ key.

Change Directory

Change Directory allows you to enter or modify telephone numbers. The modem has nonvolatile memory locations that allow you to store up to 10 telephone numbers. Each directory location can accept up to 40 characters; this includes the telephone number and dial command modifiers. Any telephone number dialed using the SDCP Dial command must appear in a directory location.

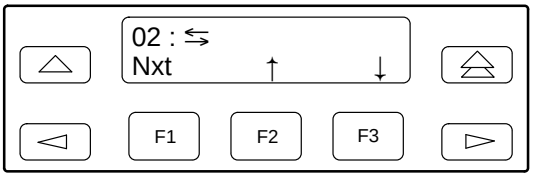
To access Change Directory from the Call Setup branch, make the following selections:

1. Press the ▻ key until Change Directory is displayed.
2. Press any function key to select Change Directory. The phone number listed in directory location 1 is displayed.
3. Select Nxt to display other directory locations.

Entering Telephone Numbers and Dial Command Modifiers into Directory Locations

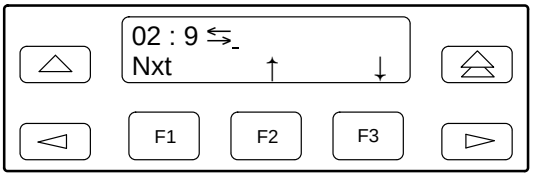
The following example uses an empty directory location for describing how to enter a telephone number. If you want to change an existing telephone number in any of the ten directory locations, follow the same procedures.

To add a telephone number to a directory location, make the following selections:



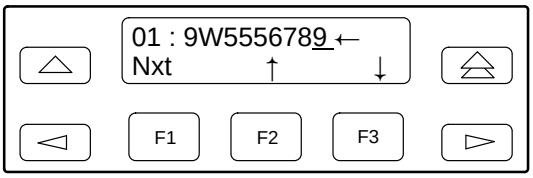
Select Nxt until a blank directory appears on the LCD. (The cursor (⇆) always appears in the first character position.)

Select F2 (↑) or F3 (↓) until the desired character is selected. This can be an alpha or numeric character. (See the D*n* command in Table 4-1 in Chapter 4 for the meaning of the different dial command modifiers.)



Press the ▻ key to move the cursor to the next character position.

Continue this key sequence until the dial command modifiers and telephone number are entered.



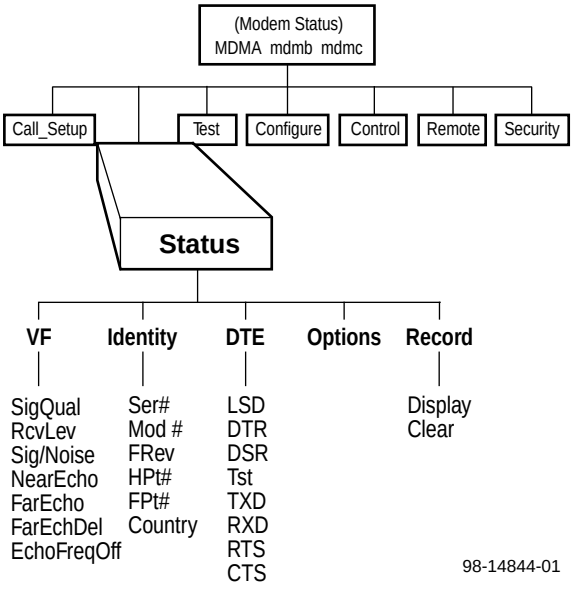
To save the number just entered, scroll to the next directory location by selecting Nxt. The number is now stored in nonvolatile memory.

Status Branch

The Status branch of the Top-Level menu allows you to view the current status of the dial or leased-line connection, the DTE interface, and the identity (for example, serial number and model number) of your equipment. The selections under Status are:

- VF
- Identity
- DTE
- SDC
- Options
- Record

To access Status from the Top-Level menu, press the ▻ key until Status appears. Select Status.



VF

VF displays the condition of the dial or leased-line connection.

To access VF from the Status branch, press F1 to select VF.

The modem's signal quality is displayed on the LCD's bottom line. Press the ▻ key to scroll and view the receive signal level, signal-to-noise ratio, near end echo, far end echo delay, and echo frequency offset. Values displayed are approximations that may be affected by the combination of impairments on the line.

> **NOTE**
>
> SigQual, NearEcho, FarEcho, FarEchDel, and EchoFreqOff values appear only for V.34, V.32*terbo*, V.32bis, and V.32 modulations.

SigQual	Signal Quality indicates the condition of the VF line. Possible values are *Excelent* (Excellent), *Good*, *Fair, Poor,* or *No Signal.*
RcvLev	Receive Signal Level indicates, in decibels referenced to one milliwatt (dBm), the actual strength of the incoming signal.
Sig/Noise	Signal-to-Noise Ratio indicates, in decibels, the receive signal strength relative to noise on the line.
NearEcho	Near End Echo displays the signal level, in decibels referenced to one milliwatt (dBm), of that portion of the transmit signal which has been echoed back by the local line termination.
FarEcho	Far End Echo displays the signal level, in decibels referenced to one milliwatt (dBm), of that portion of the transmit signal which has been echoed back by the remote line termination.
FarEchDel	Far End Echo Delay indicates the roundtrip delay in milliseconds of the far end echo.
EchoFreqOff	Echo Frequency Offset indicates the frequency offset of the far end echo.

To exit VF and remain in the Status branch, press the △ key. To exit and return to the Top-Level menu, press the ⏫ key.

Identity

Identity displays the modem's serial number, model number, firmware revision level, hardware part number and firmware part number. Retrieval of this information is useful if you are purchasing additional or replacement modems and/or making firmware upgrades.

To access Identity from the initial screen of the Status branch, press the F2 or F3 key to select Identity.

The modem's serial number is displayed on the LCD's bottom line. Press the ▻ key to scroll and view the model number, firmware revision level, hardware part number, and firmware part number.

Ser #	Serial number is an 8-digit number that identifies the modem.
Mod #	Model number is an alphanumeric number that identifies the modem as a 3821*Plus*.
FRev	Firmware revision level is an alphanumeric number that identifies the level of firmware loaded in the modem.
HPt #	Hardware part number is an 11-digit number that identifies the circuit card in the modem.
FPt #	Firmware part number is an 11-digit number that identifies to customer service personnel the firmware release number.
Country	Country is a 7-character field showing the country or continent the modem is configured for use in.

To exit this function and remain in the Status branch, press the △ key. To exit and return to the Top-Level menu, press the ⏢ key.

DTE

DTE displays the state and/or activity of the EIA-232-D interface leads. The LSD, DTR, DSR, Tst, TXD, RXD, RTS, and CTS signals are monitored. The interface leads status is updated every 5 seconds.

To access DTE from the Status branch, make the following selections:

1. Press the ▻ key until DTE appears.
2. Select DTE. The activity and state of the modem's DTE signal appear on the LCD's bottom line.
3. Press the ▻ key to scroll other signals into view.

The LCD's bottom line displays a pair of symbols for each interface lead. The first symbol indicates the signal's activity during the sampling interval. (An * (asterisk) indicates at least one transition while a blank space indicates no transitions since the last update.)

The second symbol indicates the state of the interface lead at the sampling time. (A ▮ block) indicates a Space or ON condition while an underscore (_) indicates a Mark or Off condition.)

To exit this function and remain in the Status branch, press the △ key. To exit and return to the Top-Level menu, press the ⏢ key.

Options

The Options branch lists special features installed in the 3821*Plus* modem.

Record

Record is a troubleshooting tool used by the end user in conjunction with support personnel. This function allows the end user to retrieve and report any sequence faults to support personnel. A sequence fault is an irregular or unexpected event.

There are two selections under Record: Display and Clear. Display allows up to eight sequence fault messages that have been recorded by the modem to be displayed on the LCD. If no sequence faults have occurred, then **Modem O.K.** appears.

Clear is used to remove all sequence fault messages from nonvolatile memory and the LCD.

To access Record from the Status branch, press the ▻ key until Record appears. Select Record.

To display sequence faults, select Display.

The LCD displays the first sequence fault field. (Sequence fault fields range from 1 to 8 and are identified by a number in the upper right corner.) Press the ▻ key to view the remaining fields. The message **Modem O.K.** appears if no sequence faults have occurred.

To remove sequence fault records from both the LCD and nonvolatile memory, select Clear. The message **Modem O.K.** appears.

To exit this function and remain in the Status branch, press the ⌃ key. To exit and return to the Top-Level menu, press the ⌂ key.

Test Branch

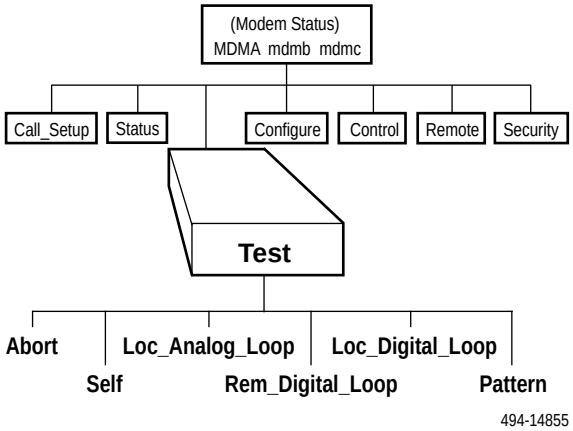
The Test branch of the Top-Level menu allows you to initiate various modem tests. Use these tests if you are having data communication problems, such as periodic character loss, random errors, or constant format errors. By the process of elimination, you can usually isolate the fault in your system.

There are six selections under Test:

- Abort
- Self (Self-Test)
- Loc Analog Loop (Local Analog Loopback)
- Rem Digital Loop (Remote Digital Loopback)
- Loc Digital Loop (Local Digital Loopback)
- Pattern

The only tests that can operate concurrently are Pattern with a Local Analog Loopback and Pattern with a Remote Digital Loopback. If any test is operating, besides the two combinations just mentioned, it must be canceled before starting another test.

The Test branch only initiates and cancels tests. If any parameters need to be set, refer to Table 3-10.



Abort

Abort ends any test that is in progress and brings the modem back to the normal mode of operation. Confirmation is provided by the **Command Complete** message.

Select Abort, and the modem stops all tests currently in progress and displays the **Command Complete** status message on the LCD.

To exit this function and remain in the Test branch, press the ⌃ key. To exit and return to the Top-Level menu, press the ⌂ key.

Self

Self performs an internal self-test of the modem, which takes less than a minute to complete. The modem must be offline (not connected with another modem), otherwise **Invalid Command** appears. This test is not valid in Remote mode and does not appear on the LCD of either modem when in Remote mode.

Select Self. (All LCD cells and SDCP status indicators light.) If the modem passes self-test, **Pass** appears on the LCD. If it fails, **Failed** appears. If the modem fails, contact your service representative.

If **Invalid Command** appears on the LCD, then another test is in progress or the modem is operating on dial lines. Select Abort to clear the current test, or disconnect to clear the dial lines, and then choose Self.

If the modem receives a ring signal during this test, the test is canceled and the **RI Abort** message appears.

To exit this function and remain in the Test branch, press the ⌃ key. To exit and return to the Top-Level menu, press the ⌂ key.

Local Analog Loop

Loc Analog Loop performs a local analog loopback (ITU-T V.54 Loop 3) that verifies modem operation as well as the connection between the DTE and modem. The modem must be offline and in synchronous or asynchronous Direct mode to perform this test, otherwise **Invalid Command** appears.

To access Loc Analog Loop from the Test branch, press the ⌦ key until Loc Analog Loop appears. Press any function key to start this test.

The message **Started** appears on the LCD, and the Test LED lights for the duration of the test.

If the Test Timeout configuration option is enabled, **Test Timeout** appears at the conclusion of the test. If it is disabled, the test operates until aborted. For more information on the Test Timeout configuration option, refer to Table 3-10 in this chapter.

A Ring Indicate during this test can cause errors.

To exit this function and remain in the Test branch, press the △ key. To exit and return to the Top-Level menu, press the ⏢ key.

Remote Digital Loop

Rem Digital Loop performs a remote digital loopback (ITU-T V.54 Loop 2). This test can verify the integrity of the local modem, the communications link, and the remote modem. Any data or pattern entered at the local DTE is sent to and returned from the remote modem. For this test to operate properly, the modems must be online and in Synchronous or Asynchronous Direct mode and, if set for V.34 modulation, must not be in Asymmetric Rate mode.

To access Rem Digital Loop from the Test branch, press the ▷ key until Rem Digital Loop appears. Press any function key to start this test.

The message **Started** appears on the LCD, and the Test LED lights for the duration of the test.

If the Test Timeout configuration option is enabled, **Test Timeout** appears at the conclusion of the test. If it is disabled, the test operates until aborted. For more information on the Test Timeout configuration option, refer to Table 3-10 in this chapter.

To exit this function and remain in the Test branch, press the △ key. To exit and return to the Top-Level menu, press the ⏢ key.

Local Digital Loop

Loc Digital Loop is issued by a local modem and forces it to loopback any data received from the remote modem. (This test operates the same as a ITU-T V.54 Loop 2 except it is issued at your modem.) This is useful if a remote modem is incapable of initiating a remote digital loopback from its location. For this test to operate properly, the modems must be online and in Synchronous or Asynchronous Direct mode and, if set for V.34 modulation, must not be in Asymmetric Rate mode.

To access Loc Digital Loop from the Test branch, press the ▷ key until Loc Digital Loop appears. Press any function key to start this test.

The message **Started** appears on the LCD and the Test LED lights.

If the message **Invalid Command** appears on the LCD, then another test is in progress. Select Abort to clear the current test and then select Loc Digital Loop.

If the Test Timeout configuration option is enabled, Test Timeout appears at the conclusion of the LCD. If it is disabled, the test operates until aborted. For more information on the Test Timeout configuration option, refer to Table 3-10 in this chapter.

To exit this function and remain in the Test branch, press the △ key. To exit and return to the Top-Level menu, press the ⏢ key.

Pattern

Pattern can transmit and receive a 511 bit error rate test pattern. It can also be used with a local analog loopback or a remote digital loopback to simulate data passing through the modem. For this test to operate properly, the modems must be online and in Synchronous or Asynchronous Direct mode. Otherwise, the message **Invalid:Bffr Mde** appears when this test is started.

To access Pattern from the Test branch, press the ▷ key until Pattern appears. Select Pattern to start this test.

BlksErrd=xxxxxxx displays the number of blocks of data found in error (block size is 1000 bits per block). The message **NoSync** can appear as a value for BlksErrd while the modem's receiver is synchronizing. The message **OvrFlw** can appear as the value for BlksErrd if the counter overflows.

Press the ▷ key to display **BlksRcvd=xxxxxxx**, number of blocks of data received.

The Pattern test can be exited and reentered without restarting the test. The BlksErrd and BlksRcvd continue counting.

If the Test Timeout configuration option is enabled, **Test Timeout** appears at the conclusion of the test. If it is disabled, the test operates until aborted. For more information on the Test Timeout configuration option, refer to Table 3-10 in this chapter.

To exit this function and remain in the Test branch, press the ^ key. To exit and return to the Top-Level menu, press the ^^ key.

Configure Branch

After installing a 3821*Plus* modem, you set its software configuration options using either the SDCP or the AT command set. This section describes how to access and use the Configure branch of the Top-Level menu via the SDCP.

The Configure branch accesses the Edit Area which is a work space where you view and change any configuration options (straps). These configuration options are loaded to the Edit Area from one of five configuration option areas: Active (Operating), Active (Saved), Customer 1, Customer 2, or Factory.

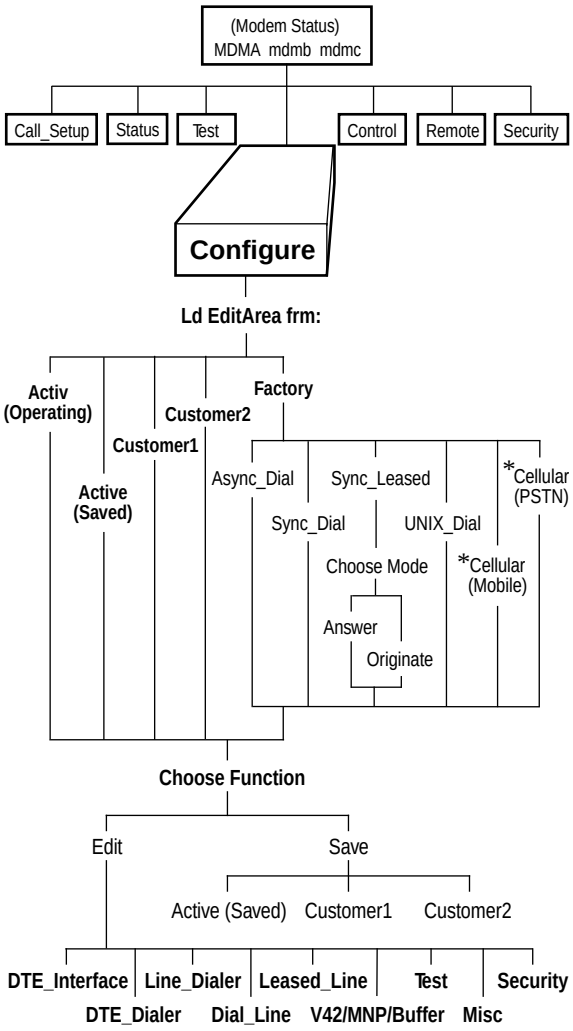
- **Active (Operating)** is a configuration area containing configuration options currently used by the modem. When the modem is powered on or when a save is performed, the contents of Active (Saved) are loaded into Active (Operating). Any changes made using AT commands directly affect this configuration area.
- **Active (Saved)** is a configuration option area containing the most recently saved changes made to any configuration options. In the event of power loss or reset, the modem retrieves these settings from nonvolatile memory.
- **Customer 1** and **Customer 2** are two additional configuration areas where you can create and store additional configurations for specific applications.
- **Factory** is a read-only (unchangeable) configuration area containing sets of predefined configuration options for **Async Dial, Sync Dial, Sync Leased (Answer/Originate), UNIX Dial,** and, if ETC is installed, **Cellular (Mobile),** and **Cellular (PSTN)**. These sets contain the most commonly used configuration options for modems installed in these hardware environments, and give you a head start in configuring your modem.

> **NOTE**
>
> If you are using AT commands, a period of time can exist in which the contents of Active (Operating) and Active (Saved) differ. Once you issue an AT&W0 (write) command, however, the two storage areas are identical.

The Configure branch of the Top-Level menu contains all of the modem's configuration options which determine how the modem operates. These configuration options are accessed by scrolling down and across various levels of the Configure branch.

The Configure branch consists of the following three levels:

- **Ld EditArea frm.** Allows the selection of the Active (Operating), Active (Saved), Customer 1, Customer 2, and Factory configuration areas. Choosing Factory results in the further display of the predefined factory templates.
- **Choose Function.** Allows you to make changes (Edit) to existing configuration options or write (Save) these changes to either the Active (Saved), Customer 1, or Customer 2 configuration area.
- **Edit Strap Group.** Contains the software configuration option groups that determine how the modem operates.

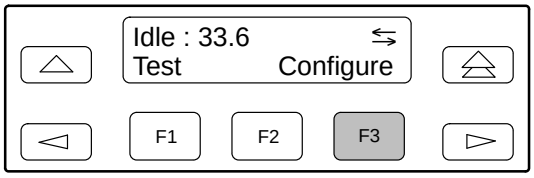


*Available if ETC is installed

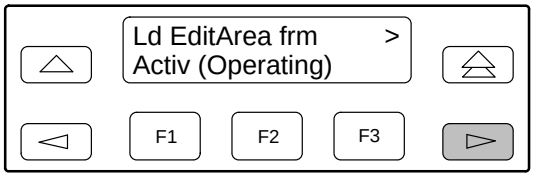
98-14845-01

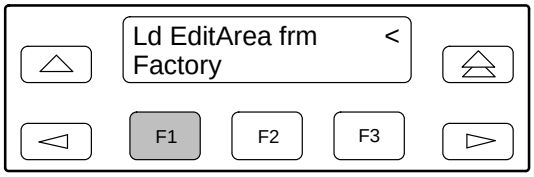
Editing and Saving a Configuration Option

The following example shows how to change the Remote Access Password using the SDCP. (If you ever intend to access another 3800*Plus* modem via the Remote branch of the Top-Level menu, the Remote Access Password must be the same for both modems.) By following these procedures you learn how to load a factory preset configuration area (in this case, Async Dial), how to edit a configuration option (Remote Access Password), and how to save changes to a configuration area (Active (Saved)). The shaded key indicates what key to press.

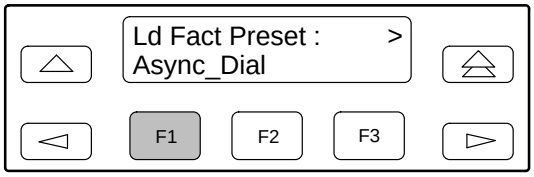


Select Configure from the Top-Level menu.

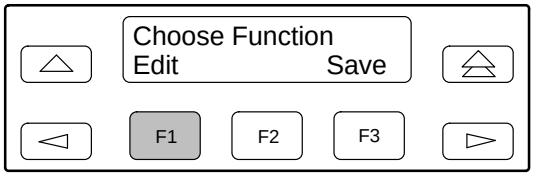




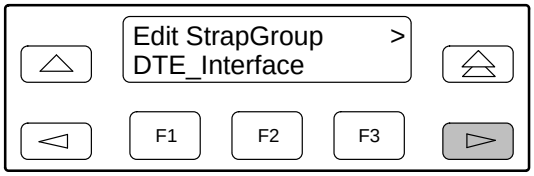
Select the Factory configuration area.



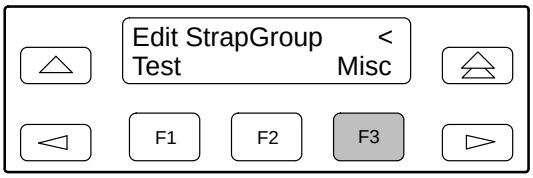
Select Async_Dial.

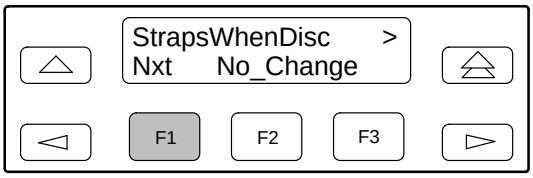


Select Edit.

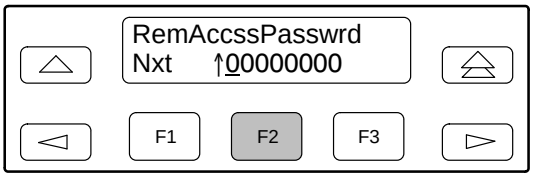


Scroll to and select the Misc configuration options group.

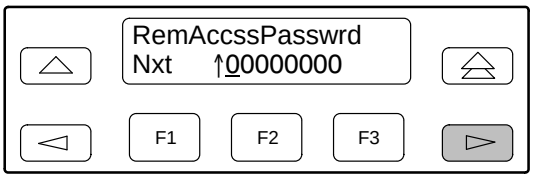




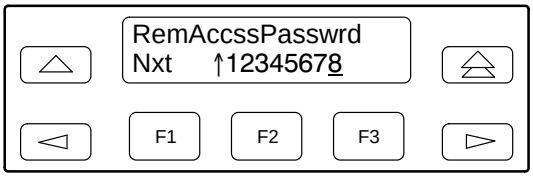
Select Nxt until RemAccssPasswrd appears.



Select the F2 (↑) key to increment password values.

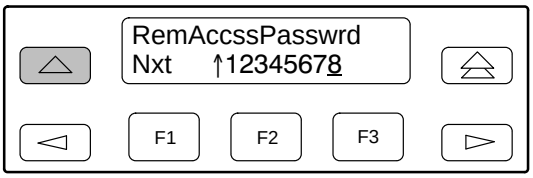


Press the ▷ key to move the cursor to the next position.

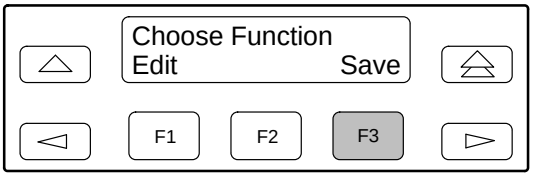


Continue this sequence until you have entered the new password value.

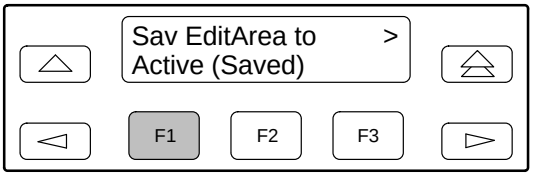
To save the new password to a configuration area, make the following selections.



Press the △ key to scroll up (twice).



Select Save.



Select a configuration area (Active (Saved), Customer 1, or Customer 2) by using the ▷ key. Press F1 or F2 to save the changes.

Select the ⏢ key to exit to the Top-Level menu or select the △ key to remain in the Configure branch.

When using the SDCP to edit configuration options, keep the following in mind:

- **Nxt** has two functions. First, it indicates that more configuration options are available within that group. These are accessed by selecting Nxt (pressing F1) and scrolling down to the next configuration option. Second, it indicates that what is displayed on the LCD is the current setting. If you scroll left or right, Nxt disappears and reappears if a new value is selected.
- **End** appears when you have scrolled down to the last configuration option available in that group. Selecting End returns you to the top of the configuration group. You are free to enter that group again or scroll left or right to the next configuration options group.
- The △ key takes you one step up in the Configure branch each time it is pressed.

- The ⏢ key causes you to exit the Configure branch and return to the Top-Level menu. If any changes are made to configuration options, the SDCP allows you to save these changes to either the Active (Saved), Customer 1, or Customer 2 configuration areas.
- The ◅ and ▻ keys move selections across the LCD.
- The function key F2 selects the configuration option that appears above it on the LCD.

The modem's configuration options are arranged into groups based upon functionality: DTE Interface (Table 3-4), DTE Dialer (Table 3-5), Line Dialer (Table 3-6), Dial Line (Table 3-7), Leased Line (Table 3-8), V.42/MNP/Buffer (Table 3-9), Test (Table 3-10), Misc (Table 3-11), and Security (Table 7-5 in Chapter 7).

Throughout these tables, two selections frequently appear on the LCD: **Enable** and **Disable**. Unless otherwise stated:

- Enable selects a configuration option and makes it available for use.
- Disable makes a configuration option unavailable for use.

Reference to particular country codes in this guide is not an assurance that the modem has been approved for use in that country. Consult your sales representative.

Not all configuration options are valid in all countries. The available settings shown in this chapter are displayed for the North America country code. See Appendix H.

NOTE

In some countries, the range of allowable values of some configuration options is restricted. The modem will accept any selection, but it will set the configuration option to the closest allowable value. The actual value that is accepted by the modem is displayed when the F2 key is pressed after a selection.

DTE Interface

The DTE Interface configuration options contain RS-232D (ITU-T V.24) and asynchronous character format information essential for maintaining a connection and for transmitting data between the DTE and the modem.

Table 3-4 shows each DTE Interface configuration option as it appears on the LCD, with the Async Dial factory default setting (the default value if the modem is just being installed) shown following the colon (:) on the first line and with all available selections listed on the second line. Following this is a description of the configuration option, a description of the available selections, and any equivalent AT commands.

Table 3-4
(1 of 6)
DTE Interface Configuration Options

Async/Sync Mode: Async
Nxt Async Sync

Asynchronous/Synchronous Mode. Determines whether the modem operates in Asynchronous mode or Synchronous mode. If the AT command set is enabled and this configuration option is set for Sync, then the modem operates in Async mode when offline.

For Async Dial and UNIX Dial, Async is the factory default. For Sync Dial and Sync Leased, Sync is the factory default.

AT command equivalents are &M*n* and &Q*n*.

Async DTE Rate:19200
Nxt 19200 115200 76800 57600 38400 14400 12000 9600 7200 4800 2400 1200 0–300

This configuration option only appears if Async/Sync Mode is configured for Async.

Asynchronous DTE Data Rate. Identifies the asynchronous DTE's operating rate to the modem. Data rates from 115,200 bps to 300 bps are supported.

To originate calls in 76,800 bps Sun Workstation environments, use either SDCP dialing, DTR dialing, or handset dialing. The modem does not support AT command dialing at this data rate.

To prevent losing data in 115,200 bps applications, DTE cables should be kept as short as possible. For IBM-compatible PCs, a buffered UART (such as a 16550A) should be used, in conjunction with software that utilizes its 16-byte buffer.

NOTE: This configuration option is ignored in Async Direct mode and synchronous mode since the DTE rate always equals the VF rate.

The factory default is 19,200 bps.

There is no AT command equivalent; AT prefix determines Async DTE Rate.

Async #Data Bits: 8
Nxt 8 7 9(DirectMde) 6(DirectMde)

This configuration option only appears if Async/Sync Mode is configured for Async or DTE Dialer Type is enabled.

Asynchronous Number of Data Bits. Determines if the asynchronous data length is composed of 6, 7, 8, or 9 data bits. This data length excludes start, parity, and stop bits.

8 – Sets data length to 8 data bits.

7 – Sets data length to 7 data bits.

9(DirectMode) – Sets data length to 9 data bits. Only valid when Error Control configuration option is set to Direct Mode.

6(DirectMode) – Sets data length to 6 data bits. Only valid when Error Control configuration option is set to Direct Mode.

The factory default is 8 data bits.

NOTE: The total character size for Buffer mode must be 10 bits. The total character size for Direct mode must be 11 bits or less, and Async #Data Bits must be 7 or 8.

There is no AT command equivalent; AT prefix determines the async character length.

Table 3-4
(2 of 6)
DTE Interface Configuration Options

Asyn Parity Bit: None **Nxt None Even Odd Mark Space**
This configuration option only appears if Async/Sync Mode is configured for Async or DTE Dialer Type is enabled. Asynchronous Parity Bit. Determines type of asynchronous parity bit. The parity of the DTE must match the parity of the modem. Parity options include None, Even, Odd, Mark, or Space. **None** – No parity bit is used. **Even** – Parity bit is set so that total number of 1's in data bits plus parity bit is even. **Odd** – Parity bit is set so that total number of 1's in data bits plus parity bit is odd. **Mark** – Parity bit is always set to 1. Only valid if Async #Data Bits configuration option is set to 7. **Space** – Parity bit is always set to 0. Only valid if Async #Data Bits configuration option is set to 7. The factory default is None. **NOTE:** The total character size for Buffer mode must be 10 bits. The total character size for Direct mode must be 11 bits or less, and Async #Data Bits must be 7 or 8. There is no AT command equivalent; AT prefix determines parity of the async character.
Asyn #Stop Bits: 1 **Nxt 1 2**
This configuration option only appears if Async/Sync Mode is configured for Async or DTE Dialer Type is enabled. Asynchronous Number of Stop Bits. Selects 1 or 2 bits to signal the end of an asynchronous character. The factory default is 1. **NOTE:** The total character size for Buffer mode must be 10 bits. The total character size for Direct mode must be 11 bits or less, and Async #Data Bits must be 7 or 8. There is no AT command equivalent; AT prefix determines the number of stop bits via autobauding.

Table 3-4
(3 of 6)
DTE Interface Configuration Options

DTR Action: Ignore
Nxt Stndrd_RS232 Ignore CntrlsOnHook Off=ReloadStrp Off=CmdMode

Data Terminal Ready Action. DTR is a signal from the DTE to the modem indicating that the DTE is connected and ready for operation.

Standard RS232 – Allows the DTE to control DTR to the modem as specified in RS-232D and ITU-T V.24 specifications. If this signal is not present, the modem will not answer or dial.

Ignore – Modem assumes DTR is always ON. This is used when DTE does not provide DTR to the modem.

CntrlsOnHook – Modem does not disconnect from the VF line during an active call until DTR is lowered by the attached DTE. This setting is required for applications in which the host processor must reset itself for the next session before the current session is terminated. The setting is ignored if the modem receives a disconnect command from the SDCP or from the COMSPHERE 6700 Series NMS.

Off=ReloadStrp – Like Standard RS232, except that when DTR is lowered the modem loads the Active (Saved) area into the Active (Operating) area.

Off=CmdMode – When the modem is online and DTR is Off for longer than the period specified by the S25 register, the modem enters online Command mode. The ATO command must be issued to return to data mode. This setting has the same effect as Ignore if AT commands are disabled.

NOTE: If V.25bis mode is used, then this configuration option must be set for Stndrd_RS232. The DTE must provide DTR to dial or answer a call.

When operating over the dial network, this selection forces DTR Action to behave as CT108/2 (Data Terminal Ready). If DTE Dialer Type configuration option is set to DTR=Direct 1, then DTR Action behaves as CT108/1 (Connect Data Set to Line).

For Async Dial, Sync Leased, and UNIX Dial, Ignore is the factory default.

For Sync Dial, Stndrd_RS232 is the factory default.

AT command equivalent is &D*n*.

DSR Control: Forced_On
Nxt Forced_On Stndrd_RS232 WinkWhenDisc Follows_DTR On_Early Delay_ToData DialBkToggle

Data Set Ready Control. DSR is a signal from the modem to the DTE indicating the modem is connected and ready for operation.

Forced On – Forces DSR output ON constantly. This is usually used for leased-line applications and when the DTE requires DSR to always be ON.

Standard RS232 – Allows the modem to control DSR to the DTE. The modem raises DSR when it begins the handshake process. DSR lowers upon disconnect. The modem is not ready to receive data until DSR, CTS, and LSD are active.

An ON state indicates to the DTE that the modem is ready to receive data. An Off state indicates that the modem is not ready to receive data, and the DTE will not send data to the modem. During a Local Analog Loop and a Remote Digital Loop, DSR is ON.

Wink When Disconnect – DSR is normally forced ON, but is turned Off for 1 to 2 seconds upon a disconnect.

Follows DTR – When the modem receives DTR from the DTE, it sends DSR to the DTE.

On Early – DSR is low when the modem is in the idle state. DSR goes high immediately upon a command to enter Data mode. This setting is required for some modem pooling applications.

Delay to Data – Operation is similar to the Standard RS232 setting except that DSR does not turn ON until the modem enters Data mode. Normally, the modem raises DSR when it begins the handshaking process.

Use this setting when the DTE cannot operate with a long DSR-to-CTS delay (common for V.32bis modulation) or when dial access security is enabled and requires a DTE-side password entry. Often, the DTE cannot accept the long delay between DSR and CTS turning ON due to the remote user entering the DTE-side password.

For Async Dial and UNIX Dial, Forced_On is the factory default.

For Sync Dial and Sync Leased, Stndrd_RS232 is the factory default.

AT command equivalent is &S*n*.

Table 3-4
(4 of 6)
DTE Interface Configuration Options

RTS Action: Ignore
Nxt Ignore Stndrd_RS232 Sim_Cntl_Car

Request-to-Send Action. RTS is a signal from the DTE to the modem indicating the DTE has data to send to the modem.

Ignore – Modem assumes RTS is always ON. Use this selection when the DTE does not provide RTS to the modem.

Standard RS232 – Allows the DTE to control RTS to the modem in normal RS-232D operation. RTS must be ON for the DTE to transmit to the modem.

Simulated Control Carrier – RTS input controls the remote modem's LSD signal. This is used for DTEs that require Line Signal Detect (LSD) to toggle ON and Off to simulate half-duplex operation. Valid only in Synchronous mode and Asynchronous Direct mode.

NOTE: If RTS Action is set for simulated control carrier, then the remote modem's LSD Control configuration option must be set for Simulated Control Carrier. Simulated Control Carrier conforms to V.13 specifications. This setting is ignored when the modem is configured for Asynchronous mode and RTS/CTS flow control is selected.

For Async Dial and UNIX Dial, Ignore is the factory default.

For Sync Dial and Sync Leased, Stndrd_RS232 is the factory default.

AT command equivalent is &R*n*.

CTS Control: Forced_On
Nxt Forced_On Stndrd_RS232 WinkWhenDisc Follows_DTR

Clear-to-Send Control. CTS is a signal from the modem to the DTE indicating that it can accept data from the DTE.

NOTE: When CTS flow control or CTS/RTS flow control is enabled, CTS will turn ON and Off regardless of the setting of CTS Control.

Forced On – CTS is forced ON at all times. Use this selection for most asynchronous applications.

Standard RS232 – In Synchronous mode, forces the state of CTS to follow the state of RTS in normal RS-232D operation. The minimum time that elapses between CTS and RTS is determined by the RTS/CTS Delay configuration option. Use this setting for most synchronous applications.

In AT Command mode, CTS (which is ON in Idle mode) goes Off just prior to DSR going active, and goes ON when the modem enters Data mode. This operation prevents losing data in applications which begin transmitting as soon as DSR and CTS are both active.

Wink When Disconnect – CTS is normally forced ON, but is turned Off for 1 to 2 seconds upon a disconnect. Use this for most UNIX applications.

Follows DTR – The state of CTS follows the state of DTR. When DTR turns ON, CTS turns ON. When DTR turns Off, CTS turns Off.

For Async Dial, Forced On is the factory default.

For Sync Dial and Sync Leased, Stndrd_RS232 is the factory default.

For UNIX Dial, WinkWhenDisc is the factory default.

AT command equivalent is \D*n*.

Table 3-4
(5 of 6)
DTE Interface Configuration Options

RTS/CTS Delay: 0 msec
Nxt 0msec 10msec 50msec 150msec 600msec

Request-to-Send/Clear-to-Send Delay. RTS/CTS Delay sets the delay time between the modem receiving RTS from the DTE and the modem sending CTS to the DTE.

This delay is only valid in Async Direct mode and synchronous applications when it is necessary to have a short delay between the time the DTE raises RTS and the time the modem presents CTS to allow the DTE to send data.

NOTE: For this configuration option to be valid, both the RTS Action and the CTS Control configuration options must be set for Stndrd RS232. If RTS Action is set for Ignore, RTS is always ON and this configuration option has no effect.

The factory default is 0 milliseconds.

AT command equivalent is S-register S26=*n*.

LSD Control: Stndrd_RS232
Nxt Stndrd_RS232 Forced_On WinkWhenDisc Follows_DTR Sim_Cntl_Car =DTR/DiscOff BridgeRetrain

Line Signal Detect Control. LSD is a signal indicating that the carrier signal is being received from the remote modem. It is normally turned Off to the DTE when the power level of the received carrier signal drops below the carrier detect threshold.

Standard RS232 – LSD is ON when the modem detects the remote modem's carrier signal. LSD turns Off when the carrier signal strength drops below carrier detect threshold.

Forced On – Forces LSD to be ON at all times.

Wink When Disconnect – LSD is normally forced ON, but can be turned Off for 1 to 2 seconds upon a disconnect. This is used for UNIX DTEs.

Follows DTR – The state of LSD follows the state of DTR. When DTR turns ON, LSD turns ON. When DTR turns Off, LSD turns Off.

Simulated Control Carrier – LSD follows the state of RTS of the remote DTE via the V.13 simulated control carrier signaling. This is required for hosts that cannot support full-duplex operation. Valid only in Synchronous mode and Asynchronous Direct mode.

NOTE: If LSD Control is set for simulated control carrier, then the RTS Action configuration option on the remote modem must be set for Simulated Control Carrier.

=DTR/Disconnect Off – The state of LSD follows the state of DTR except when disconnecting once a connection is established. In this instance, DTR remains ON and LSD turns Off. DTR must then toggle Off and then ON again for LSD to turn ON. This setting is required for AT&T DATAKIT dial-out applications.

NOTE: If LSD Control is set for =DTR/DiscOff, then the DTR Action configuration option must be set for Stndrd_RS232.

For Async Dial, Sync Dial, and Sync Leased, Stndrd_RS232 is the factory default.

For UNIX Dial, WinkWhenDisc is the factory default.

AT command equivalent is &C*n*.

Table 3-4
(6 of 6)
DTE Interface Configuration Options

TX Clock Source: Internal **Nxt Internal External RXC_Loop**
This configuration option only appears when Async/Sync Mode is configured for Sync. Transmit Clock Source. Determines the source of timing for synchronous data transmitted from the DTE. **Internal** – The transmit data's clock source is derived from the modem's internal clock and output on Pin 15 (TXC) of the RS-232D interface. **External** – The transmit data's clock source is provided by the DTE on Pin 24 (EXT) on the RS-232D interface. This configuration option automatically disables Autorate, Automode, and Asymmetric Rate mode when running V.34 modulation. **RXC Loop** – The modem's transmit clock is derived from its received signal and is output on Pin 15 (TXC) of the RS-232D interface. **NOTE:** This configuration option only appears if Async/Sync Mode is configured for Sync. The factory default is Internal. AT command equivalent is &X*n*.
DTE Rate=VF: Disable **End Disable Enable**
DTE Rate = VF Rate. Forces the data rate of the connection between the DTE (computer) and the modem to be the same as the VF (telephone line) rate. **Disable** – The DTE rate is the value of the Async DTE Rate configuration option. **Enable** – The DTE rate is identical with the VF rate. The factory default is Disable. AT command equivalent is S-register S90=*n*.

DTE Dialer

The DTE Dialer configuration options establish the DTE-to-modem protocol for call establishment and control.

Table 3-5 shows each DTE Dialer configuration option as it appears on the LCD.

Table 3-5
(1 of 5)
DTE Dialer Configuration Options

DTE Dialer Type: AT **Nxt AT Disable V25bis_Async V25bis_Bsync V25bis_HDLC DTR=Direct1 AT&T_Exclusv**
Data Terminal Equipment Dialer Type. Identifies to the modem the type of dialing method and protocol used by the DTE. **AT** – Allows AT command protocol to be used as a method for entering commands and dialing when used in an asynchronous application. **NOTE:** The modem will not respond to AT commands if DTE Dialer Type is not set for AT. **Disable** – Disables any type of DTE dialing method. Dialing can only be performed using the SDCP's Dial command or attached telephone. **V.25bis Async** – Selects V.25bis Async as the dialing method and protocol used by the modem. Ths option is available only when Async/Sync Mode is set to Async. The character length must be 7 data bits with even parity and 1 stop bit. **V.25bis Bisync** – Selects V.25bis Bisync as the dialing method and protocol used by the modem. This is also known as character-oriented protocol. This framing protocol uses two synchronous control characters and a start-of-text control character before the text block and an end-of-text control character after the text block. This option is available only when Async/Sync Mode is set to Sync. The character length must be 7 data bits with odd parity and 1 stop bit. **V.25bis HDLC** – Selects V.25bis HDLC as the dialing method and protocol used by the modem. This is also known as bit-oriented protocol. This framing protocol uses flag, address and control characters before the text block and a frame sequence check and flag after the text block. This option is available only when Async/Sync Mode is set to Sync. **DTR=Direct1** – Allows the modem to automatically dial the number stored in directory location 1 whenever DTR turns ON. **NOTE:** DTR dialing should not be used if dial access security is enabled. **AT&T Exclusive** – Enables a subset of the proprietary AT&T command set, which is required for some applications that use AT&T equipment. Currently, the only application supported is AT&T DATAKIT. This option is available only when Async/Sync Mode is set to Async. For Async Dial and UNIX Dial, AT is the factory default. For Sync Dial and Sync Leased, Disable is the factory default. AT command equivalents are &M*n* and &Q*n*.
***AT Escape Char: 043 ASCI** **Nxt ↑ 043 ASCI**
AT Escape Character. The escape sequence (+++) allows you to move back and forth between Command mode and Data mode. The ASCII value of the escape character (043 ASCII) can be set to any ASCII value from 0 ASCII to 255 ASCII. However, the escape character is disabled if a value greater than 127 ASCII is entered. When disabled, the call must be disconnected to return to Command mode. The factory default is 043 (ASCII AT escape character). AT command equivalent is S-register S2=*n*.
* This configuration option only appears if DTE Dialer Type is configured for AT.

Table 3-5
(2 of 5)
DTE Dialer Configuration Options

***Escape GuardTim: 1sec** **Nxt 1sec 200msec 400msec 600msec 800msec 2sec**
Escape Guard Time. Determines the length of the required pause before and after the escape sequence is issued. The guard time prevents the modem from interpreting data as the escape sequence characters. The factory default is 1 second. AT command equivalent is S-register S12=*n*.
***BreakForceEscap: Disable** **Nxt Disable Enable**
Break Forces Escape. Determines whether or not the modem should enter Command mode when it receives a break character from the DTE. **Disable** – A break character is sent to the remote end. **Enable** – Modem escapes into AT Command mode, and a break character is not sent to the remote end. The factory default is Disable. AT command equivalent is \K*n*.
***CommandCharEcho: Enable** **Nxt Enable Disable**
Command Character Echo. Controls whether or not characters are echoed back to the DTE when the modem is in Command mode. The factory default is Enable. AT command equivalent is E*n*.
***CarriageRtn Char: 013 ASCI** **Nxt ↑ 013 ASCI**
Carriage Return Character. Allows you to change the ASCII character used to terminate an AT command to any ASCII value from 0 to 127. The factory default is 013 (ASCII carriage return). AT command equivalent is S-register S3=*n*.
***Backspace Char: 008 ASCI** **Nxt ↑ 008 ASCI**
Backspace Character. Sets the character used to perform a backspace in Command mode. The factory default is 008 (ASCII backspace character). AT command equivalent is S-register S5=*n*.
* This configuration option only appears if DTE Dialer Type is configured for AT.

Table 3-5
(3 of 5)
DTE Dialer Configuration Options

***Linefeed Char: 010 ASCI** **Nxt ↑ 010 ASCI**
Line Feed Character. Sets the character used to perform a line feed in Command mode for responses from the modem. The factory default is 010 (ASCII line feed character). AT command equivalent is S-register S4=*n*.
***Result Codes: Enable** **Nxt Enable Disable EnableInOrig**
Result Codes. Result codes are informational messages (such as Connect and Ring) sent from the modem and displayed on the asynchronous DTE terminal. (For a list of result codes, refer to Appendix B.) **Enable** – Modem sends result codes to the DTE. **Disable** – Modem does not send result codes to the DTE. **EnableInOrig** – For UNIX applications, enable result codes only on the originating modem. This prevents the DTE on the answer side from interpreting result codes as login attempts. For Async Dial, Enable is the factory default. For UNIX Dial, EnableInOrig is the factory default. AT command equivalent is Q*n*.
***ExtendResltCode: Enable** **Nxt Enable Disable Add/EC Add/V42,MNP Use_DTE_Rate**
Extended Result Codes. Informational messages such as VF data rate and Error Control are displayed with the result codes. (For a list of result codes, refer to Appendix B.) **Enable** – **NO DIALTONE, BUSY, NO ANSWER**, and **CONNECT xxxx** (xxxx = VF data rate) are displayed along with result codes listed in Appendix B. **Disable** – Only **OK, CONNECT, RING, NO CARRIER,** and **ERROR** result codes appear. **NOTE:** NO DIALTONE is valid only if Dial Tone Detect configuration option is enabled. BUSY appears if Busy Detect configuration option is enabled. **Add/EC** – Places the EC suffix after the result code text if error control is used. For example, CONNECT 9600/EC. **Add/V.42, MNP** – Places either the /V.42 or /MNP suffix after the result code text if data compression is used. For example, CONNECT 9600/V42b. **Use DTE Rate** – Allows the DTE rate to be displayed in the Connect message instead of the line rate. This feature is required in some modem pooling applications. The factory default is Enable. AT command equivalent is X*n*.
* This configuration option only appears if DTE Dialer Type is configured for AT.

Table 3-5
(4 of 5)
DTE Dialer Configuration Options

***ResultCode Form: Words**
Nxt Words Numbers (1) Numbers (2)

Result Codes Format. Controls whether or not result codes appear as words or as numeric codes. Some DTEs do not recognize result codes as words; therefore, numbers are required. The Numbers (2) format is required for some modem pooling applications. (For a list of result codes, refer to Appendix B.)

The factory default is Words.

AT command equivalent is V*n*.

***AT Cmnd Mode: Normal**
Nxt Normal No_ERROR NoStrapOrERR

AT Command Mode. Determines how the modem responds to valid and invalid AT commands.

NOTE: Since this configuration option affects AT commands, it cannot be changed by the AT&F command. However, it can be changed by selecting a factory preset configuration via the SDCP.

Normal – Allows normal operation of the AT command set. The modem acts upon all valid AT commands and issues the ERROR result code for invalid commands. If a string with multiple commands is entered, then an invalid command within that string will prevent the execution of subsequent valid commands.

No ERROR – Operates similar to Normal mode, however, the modem does not issue an ERROR result code for invalid commands. When an invalid command equivalent is encountered, the modem ignores it and issues the OK result code. If a string with multiple commands is entered, then an invalid command within that string will not prevent the execution of subsequent valid commands.

No Strap or ERROR – Ignores all AT commands (including valid commands) that cause a configuration option to change. Only nonconfiguring commands (for example ATD, ATA, and ATI) are executed; the ERROR result code is never returned.

The factory default is Normal.

AT command equivalent is S-register S84=*n*

V25bis Coding: ASCII
Nxt ASCII EBCDIC

V.25bis Coding. Identifies to the modem whether the DTE is using ASCII code or EBCDIC code for V.25bis commands. The modem responds to the DTE using the same coding.

NOTE: This configuration option only appears if DTE Dialer is configured for V25bis HDLC or V25bis Bisync.

The factory default is ASCII.

AT command equivalent is S-register S62=*n*.

* This configuration option only appears if DTE Dialer Type is configured for AT.

Table 3-5
(5 of 5)
DTE Dialer Configuration Options

V25bis IdleFill: Mark **Nxt Mark Flag**
V.25bis Idle Fill. Determines whether a mark or flag is used as an idle fill character for the DTE. The modem responds to the DTE using the same idle fill. **NOTE:** This configuration option only appears if DTE Dialer is configured for V.25bis HDLC or V25bis Bisync. The factory default is Mark. AT command equivalent is S-register S63=*n.*
V.25b NewLineChr: CR+LF **Nxt CR+LF CR LF**
V.25bis New Line Character. Sets the modem for the command line terminator used by the DTE in V.25bis Async mode. The modem responds to the DTE using the same line terminator. **NOTE:** This configuration option only appears if DTE Dialer is configured for V25bis Async. The factory default is CR+LF. AT command equivalent is S-register S64=*n.*

Line Dialer

The Line Dialer configuration options establish parameters used by the modem to answer or originate calls.

Table 3-6 shows each Line Dialer configuration option as it appears on the LCD.

Table 3-6
(1 of 4)
Line Dialer Configuration Options

AutoAnswerRing#: 1 **Nxt 1 Disable 2 4 6 8 10**
Auto-Answer Ring Count. Determines the number of rings necessary before the answering modem answers an incoming call. For example, if this option is set for 2, then the answering modem answers after the second ring. **NOTE:** Although SDCP selections are limited (1, 2, 4, 6, 8, or 10), values set by AT commands can display from 1 to 255 rings. **Disable** – If selected, the modem must be answered using either the SDCP's Answer command or via AT commands. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H. AT command equivalent is S-register S0=*n*.
Dialer Type: Tone **Nxt Tone Pulse**
Dialer Type. Selects either tone (DTMF) dialing or pulse (rotary) dialing mode. The factory default is Tone. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H. AT command equivalents are the Dial command modifiers T and P.
DialTone Detect: Enable **Nxt Enable Disable**
Dial Tone Detect. Sets the modem for dial tone detection (enable) or blind dialing (disable). **Enable** – Modem disconnects the call if a dial tone is not detected within 10 seconds and displays **No Dial Tone** on both the LCD and asynchronous DTE terminal. **Disable** – Modem dials a call whether or not it detects a dial tone on the line. This is known as blind dialing. The period of time the modem waits before dialing is specified in the Blind Dial Pause configuration option. The factory default is Enable. AT command equivalent is X*n*.
Blind Dial Paus: 2sec **Nxt 2sec 4sec 6sec 8sec 10sec 20sec**
Blind Dial Pause. Determines how long the modem waits before dialing a telephone number when DialTone Detect is disabled. **NOTE:** The Blind Dial Pause configuration option only appears when the Dial Tone Detect configuration option is disabled. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H. AT command equivalent is S-register S6=*n*.

Table 3-6
(2 of 4)
Line Dialer Configuration Options

BusyTone Detect: Enable
Nxt Enable Disable

Busy Tone Detect. Sets the modem to monitor for Busy Tone (Enable) or ignore Busy Tone (Disable).

This configuration option is normally enabled; however, if the modem receives false busy tones, this configuration option can be disabled and the modem ignores all busy tones.

The factory default is Enable.

AT command equivalent is X*n*.

“,” Pause Time: 2sec
Nxt 2sec 4sec 6sec 8sec 10sec 20sec

Pause Time. Determines the number of seconds the modem pauses when it encounters a comma (,) in the dial command string.

NOTE: Although SDCP selections are limited (2, 4, 6, 8, 10, or 20), values set by the AT commands can be displayed as 0 to 255 seconds.

The factory default is 2sec.

NOTE: The default and permitted settings of this option are country-dependent. See Appendix H.

AT command equivalent is S-register S8=*n*.

NoAnswer Timout: 45sec
Nxt 45sec 30sec 60sec 120sec

No Answer Abort Time-out. Determines the number of seconds an originating modem waits before abandoning a call attempt when no answer tone is received.

NOTE: Although SDCP selections are limited (30, 45, 60, or 120), values set by AT commands can display from 1 to 255 seconds.

NOTE: The default and permitted settings of this option are country-dependent. See Appendix H.

AT command equivalent is S-register S7=*n*.

Fast Disconnect: Disable
Nxt Disable Enable

Fast Disconnect. Allows the modem to disconnect immediately after receiving a disconnect command from a local DTE or its own diagnostic control panel.

Disable – The modem follows its normal disconnect sequence by issuing a cleardown sequence or long space disconnect. This is also known as a graceful disconnect since the other modem receives advance notice of a disconnection.

Enable – Use this setting if the DTE requires that the modem be made available as soon as possible after receiving a disconnect command.

NOTE: This abrupt method of disconnecting may cause problems with the remote modem, which may interpret the disconnection as an error instead of a valid disconnect.

The factory default is Disable.

AT command equivalent is S-register S85=*n*.

Table 3-6
(3 of 4)
Line Dialer Configuration Options

Long Space Disc: Enable **Nxt Enable Disable**
Long Space Disconnect. Determines the modem's response to a continuous spacing condition sent from the remote modem when it goes on-hook. Issuing a long space is one method of disconnecting a call. **NOTE:** This configuration option is ignored when the modem operates in Synchronous mode or Dial Backup mode. **Enable** – Modem disconnects if it receives a continuous space from the DTE. The modem's transmitter will transmit 4 seconds of long space upon a disconnect. **Disable** – Modem does not disconnect if it receives a continuous space from the DTE. Modem will not transmit a long space disconnect. For Async Dial, UNIX Dial, and Sync Leased, Enable is the factory default. For Sync Dial, Disable is the factory default. AT command equivalent is Y*n*.
No Carrier Disc: 2sec **Nxt 2sec 5sec Disable 10sec 20sec**
No Carrier Disconnect. If the modem no longer receives carrier from the remote modem, it disconnects the call. This configuration option determines how long carrier is Off before the modem disconnects. Loss of carrier is one method of disconnecting a call. **2, 5, 10, 20 sec** – Modem disconnects if carrier turns Off for more than 2 seconds, 5 seconds, 10 seconds, or 20 seconds. **Disable** – Modem does not disconnect if carrier turns Off. The factory default is 2sec. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H. AT command equivalent is S-register S10=*n*.
No Data Disc: Disable **Nxt Disable 10min 30min 60min**
No Data Disconnect. Forces the modem to disconnect if no data is transmitted or received within a specified amount of time. **Disable** – Modem remains connected despite the lack of data flow. **10, 30, 60 min** – Modem disconnects if data is not received or transmitted within 10-minute, 30-minute, or 60-minute intervals. The factory default is Disable. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H. AT command equivalent is \T*n*.

Table 3-6
(4 of 4)
Line Dialer Configuration Options

NoDataDiscTrig: TXD and RXD
Nxt TXD and RXD TXD Only RXD Only TXD or RXD

No Data Disconnect Trigger Signal. Works in conjunction with No Data Disconnect (\T), and determines whether Pin 2 (transmit data) or Pin 3 (receive data) of the modem's RS-232 serial interface is monitored so that the modem can disconnect the call if there is no activity for a certain period of time.

The No Data Disconnect Trigger Signal configuration option is unavailable and is not displayed on the SDCP when No Data Disconnect is disabled. The reloading of factory defaults does not affect No Data Disconnect Trigger Signal.

TXD and RXD – Disconnect if no data is transmitted and received for specified period.

TXD Only – Disconnect if no data is transmitted for specified period.

RXD Only – Disconnect if no data is received for specified period.

TXD or RXD – Disconnect if no data is transmitted or received for specified period.

The factory default is TXD and RXD.

AT command equivalent is S-register S80=*n*.

Auto Make Busy: Disable
Nxt Disable Enable

Automatic Make Busy. Forces the modem to go off-hook under the following conditions: a local analog loopback is performed, a self-test is performed, or if the modem is switched to the service line.

NOTE: This configuration option should only be used when the modem is located behind a user's Private Branch Exchange (PBX). The Make Busy Network Interface Module (NIM) must be installed on the COMSPHERE 3000 Series Carrier. Refer to the *COMSPHERE 3000 Series Carrier, Installation Manual*.

The factory default is Disable.

AT command equivalent is S-register S40=*n*.

MakeBusyViaDTR: Disable
End Disable Enable

Make Busy Via DTR. Determines if the modem goes off-hook when DTR is Off. Enable this setting if the DTE normally keeps DTR ON and turns DTR Off when the DTE cannot accept a call.

NOTE: This configuration option should only be used when the modem is located behind a user's Private Branch Exchange (PBX).

The factory default is Disable.

AT command equivalent is S-register S69=*n*.

Dial Line

The Dial Line configuration options are used to configure the modem for operation over dial lines.

Table 3-7 shows each Dial Line configuration option as it appears on the LCD.

The Dial Line configuration group does not appear if the modem is configured with the Sync Leased factory preset template, or if the &L1, &L2, &L3, or &L4 command is entered.

Table 3-7
(1 of 3)
Dial Line Configuration Options

Modulation: V34 **Nxt V34 V32bis/terbo V21/V22/BELL**
Modulation determines the modem's primary dial modulation group: V.34; V.32bis and V.32*terbo*; or V.21, V.22bis, V.22, Bell 212A, and Bell 103J. The factory default is V34 (V.34 modulations).
Dial LineRate: 33600(V34) **Nxt 33600(V34) 31200(V34) 28800(V34) 26400(V34) 24000(V34) 21600(V34) 19200(V34) 16800(V34) 14400(V34) 12000(V34) 9600(V34) 7200(V34) 4800(V34) 2400(V34)** **- OR -** **Nxt 19200(V32t) 16800(V32t) 14400(V32b) 12000(V32b) 9600(V32) 7200(V32b) 4800(V32)** **- OR -** **Nxt 2400(V22bis) 1200(V22) 1200(212A) 0–300(V21) 0–300(103J)**
Dial Line Rate. This configuration option determines the modem's data rate and modulation scheme for operation on dial lines. Online changes do not take effect until a disconnect occurs. Dial Line Rate sets the upper limit rate and modulation; lower speed connections may still be possible. What Dial Line Rate configuration options are displayed depends on the setting of Modulation. **33600(V34), 31200(V34), 28800(V34), 26400(V34), 24000(V34), 21600(V34), 19200(V34), 16800(V34), 14400(V34), 12000(V34), 9600(V34), 7200(V34), 4800(V34)** – The modem operates using V.34 modulation at the data rate selected. The change does not take effect until the modem is reset. The modem can be forced by the remote modem to a lower data rate. Note that if Automode is enabled and Dial Line Rate is set to V.34, the modem can connect in a non-V.34 modulation. However, if Dial Line Rate is not set to V.34, it cannot be Automoded to V.34. **19200(V32t), 16800(V32t), 14400(V32b), 12000(V32b), 9600(V32), 7200(V32b), 4800(V32)** – The modem operates using V.32*terbo*, V.32bis, or V.32 modulation at the data rate selected. The modem can be forced by the remote modem to a lower data rate. **2400(V22bis), 1200(V22), 1200(212A)** – Modem operates using the modulation and data rate selected. **0–300(V21), 0–300(103J)** – Modem operates in full-duplex, Asynchronous mode. These data rates do not support V.42 or MNP error control. The factory default is 33600(V34). AT command equivalent is S-register S41=*n.*

Table 3-7
(2 of 3)
Dial Line Configuration Options

Automode: Enable
Nxt Enable Disable System 85

Automode. Allows the modem to automatically detect the remote modem's modulation.

Enable – The modem automatically adapts to the modulation scheme and line rate of the remote modem, and the VF line condition. However, the maximum data rate the modem uses is determined by the Dial Line Rate configuration option. Bell 103J protocol is used for data rates of 0–300 bps.

Disable – Connection fails if the remote modem does not support the selected modulation.

System 85 – Modifies parameters used by the connection process. Specify System 85 only if your modem is in a modem pool attached to a System 85 Private Branch Exchange (PBX).

The factory default is Enable.

AT command equivalent is S-register S78 = *n*.

Autorate: Enable
Nxt Enable Disable StartAt48 StartAt96

Autorate. Controls the modem's ability to adjust its speed upward and downward to accommodate the conditions of the VF line.

Enable – Once connected, the modem automatically lowers the line rate if line conditions become impaired. When line conditions improve, the modem automatically shifts up to the highest data rate the line can support, limited by the value of the Dial Line Rate configuration option. This autorating only occurs between 4800 bps and 19,200 bps during V.32bis and V.32*terbo* connections and between 2400 bps and 33,600 bps during V.34 connections.

Disable – Line rate does not vary after the initial line rate selection during start-up.

StartAt48, StartAt96 – Useful for lines with known noise problems, these settings cause the modem to connect at 4800 bps (StartAt48) or 9600 bps (StartAt96). If line conditions warrant it, the modem shifts up to the next higher rate until the value of Dial Line Rate or the highest possible rate for the line is reached.

The factory default is Enable.

AT command equivalent is S-register S76=*n*.

Dial TX Level: Permissv(–9)
Nxt Permissv(–9) –10 dBm –11 dBm –12 dBm –13 dBm –14 dBm –15 dBm –16 dBm –17 dBm
–18 dBm –19 dBm –20 dBm –21 dBm –22 dBm –23 dBm –24 dBm –25 dBm –26 dBm –27 dBm
–28 dBm –29 dBm –30 dBm –31 dBm –32 dBm ETC 1.0_Cell ETC 1.1_Cell

Dial Transmit Level. Sets the power output level of the transmit signal over dial lines.

Permissive (–9 dBm) – The modem transmits data at approximately –9 dBm. This is true whether the modem is connected to an RJ11-type permissive jack or to an RJ41 or RJ45 programmable jack.

ETC 1.0_Cell – Available only if ETC is installed. Transmit level is automatically adjusted in response to line conditions according to the proprietary Enhanced Throughput Cellular (ETC) 1.0 specification. Use only with remote modems set to ETC 1.0_Cell, and limit the data rate to 4800 bps.

ETC 1.1_Cell – Available only if ETC is installed. Transmit level is automatically adjusted in response to line conditions according to the proprietary Enhanced Throughput Cellular 1.1 specification.

The factory default is Permissv(–9).

NOTE: The default and permitted settings of this option are country-dependent. See Appendix H.

AT command equivalents are &I*n* and &J*n*.

Table 3-7
(3 of 3)
Dial Line Configuration Options

V22b Guard Tone: Disable **Nxt Disable 550Hz 1800Hz**
V.22bis Guard Tone. Determines whether the V.22bis guard tone is disabled, set to 550 Hz, or set to 1800 Hz. **Disable** – No guard tone. **550 Hz or 1800 Hz** – When the modem is in Answer mode, it transmits the guard tone at this frequency. The factory default is Disable. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H. AT command equivalent is &G*n*.
Train Time: Long **Nxt Long Short**
Train Time. Controls V.34, V.32*terbo*, V.32bis, and V.32 train. Determines whether minimum or maximum time durations are used during the handshaking sequence for both dial and leased line applications. **NOTE:** This configuration option only appears when the Dial Line Rate configuration option is set for V.34, V.32*terbo*, V.32bis, or V.32. **Long** – Selects long train. Use this setting whenever far-end frequency offset (phase roll) may be encountered. This is usually only required when transmitting over satellite links. **Short** – Allows the modem to train-up faster. The factory default is Long. AT command equivalent is S-register S43=*n*.
Asymmetric Rate: Enable **End Enable Disable**
Asymmetric Rate. Controls rate symmetry when running V.34 modulation. (This configuration option does not appear unless V.34 modulation is selected.) **Enable** – The modem operates in asymmetric rate mode (the transmit and receive rates can be different) when running V.34 modulation. Asymmetric Rate must be enabled in both modems. **Disable** – The modem operates in symmetric rate mode (the transmit and receive rates are identical) when running V.34 modulation. Either modem can force symmetric mode by disabling Asymmetric Rate. The factory default is Enable. AT command equivalent is S-register S14=*n*.

Leased Line

The Leased Line configuration options are used to configure the modem for operation over leased lines.

The Leased Line configuration group only appears if the modem is configured with the Sync Leased factory preset template, or if the &L1, &L2, &L3, or &L4 command is entered.

Table 3-8 shows each Leased Line configuration option as it appears on the LCD.

Table 3-8
(1 of 2)
Leased Line Configuration Options

Leased Mode: 2WLL-Orig **Nxt 2WLL-Orig 2WLL-Ans**
Leased Mode. Sets the modem for either Answer mode (receiving a call) or Originate mode (initiating a call). **NOTE:** For proper operation over leased lines, one modem must be set for Originate mode, and the other modem must be set for Answer mode. The factory default is 2WLL-Orig. AT command equivalent is &L*n*.
Modulation: V34 **Nxt V34 V32bis/terbo V22bis**
Modulation determines the modem's primary leased line modulation group: V.34, V.32bis and V.32*terbo*, or V.22bis. The factory default is V34 (V.34 modulations).
LeasedLine Rate: 33600(V34) **Nxt 33600(V34) 31200(V34) 28800(V34) 26400(V34) 24000(V34) 21600(V34) 19200(V34) 16800(V34) 14400(V34) 12000(V34) 9600(V34) 7200(V34) 4800(V34) 2400(V34)** **- OR -** **Nxt 19200(V32t) 16800(V32t) 14400(V32b) 12000(V32b) 9600(V32b) 7200(V32b) 4800(V32b)** **- OR -** **Nxt 2400(V22bis)**
Leased-Line Rate. Determines the modem's data rate and modulation scheme for operation on leased lines. In Async mode, the DTE rate must equal the leased-line rate. Leased Line Rate sets the upper limit rate and modulation; lower speed connections may still be possible and the modem can still be commanded to fall back by a remote modem. What Leased Line Rate configuration options are displayed depends on the setting of Modulation. **33600(V34), 31200(V34), 28800(V34), 26400(V34), 24000(V34), 21600(V34), 19200(V34), 16800(V34), 14400(V34), 12000(V34), 9600(V34), 7200(V34), 4800(V34), 2400(V34)** – The modem operates using V.34 modulation at the data rate selected. The change does not take effect until the modem is reset. **19200(V.32t), 16800(V32t), 14400(V.32bis), 12000(V.32bis), 9600 (V.32bis), 7200(V.32bis), 4800(V.32bis)** – The modem operates using V.32*terbo* or V.32bis modulation at the data rate selected. **2400(V.22bis)** – The modem operates using V.22bis modulation at 2400 bps. **NOTE:** It is recommended that both modems use the same fixed data rate. The factory default is 33600(V34). AT command equivalent is S-register S44=*n*.

Table 3-8
(2 of 2)
Leased Line Configuration Options

Autorate: Enable **Nxt Enable Disable**
Autorate. The modems adapt to VF line condition and connect at the optimum rate during initial line establishment. Once connected, the modem automatically lowers the line rate if line conditions become impaired. When line conditions improve, the modem automatically shifts up to the highest data rate the line can support. This autorating only occurs between 4800 bps and 19,200 bps during V.32bis and V.32*terbo* connections and between 2400 bps and 33,600 bps during V.34 connections. The factory default is Enable. AT command equivalent is S-register S82=*n*.
Leased TX Level: 0 **Nxt 0 –1 –2 –3 –4 –5 –6 –7 –8 –9 –10 –11 –12 –13 –14 –15**
Leased Transmit Level. Selects the modem's transmit power level over leased lines. The transmit output level can be selected in 1 dBm decrements from 0 dBm to –15 dBm. For V.34 operation over two-wire connections, do not set Leased TX Level to a value higher than –9 dBm. The factory default is 0 dBm. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H. AT command equivalent is S-register S45=*n*.
CarrierOn Level: –43dbm **Nxt –43dbm –33dbm –26dbm**
Carrier On Level. This configuration option controls the carrier detection threshold for leased lines. When the power level of the receive carrier signal drops 2 dBm below this level (–26 dBm, –33 dBm, or –43 dBm), LSD turns Off. When the carrier signal is greater than this level, LSD turns ON. The factory default is –43dbm. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H. AT command equivalent is S-register S48=*n*.
Asymmetric Rate: Enable **End Enable Disable**
Asymmetric Rate. Controls rate symmetry when running V.34 modulation. (This configuration option does not appear unless V.34 modulation is selected.) **Enable** – The modem operates in asymmetric rate mode (the transmit and receive rates can be different) when running V.34 modulation. Asymmetric Rate must be enabled in both modems. **Disable** – The modem operates in symmetric rate mode (the transmit and receive rates are identical) when running V.34 modulation. Either modem can force symmetric mode by disabling Asymmetric Rate. The factory default is Enable. AT command equivalent is S-register S14=*n*.

V.42/MNP/Buffer

V.42/MNP/Buffer configuration options determine the type of error correction and flow control used by the modems and attached DTEs.

Some choices within this group may not appear depending upon how previous configuration options have been selected. If the Async/Sync Mode configuration option is set for synchronous operation (see DTE Interface configuration options group), then the V.42/MNP/Buffer group does not appear on the LCD. Any changes made to configuration options within this group only take effect after a disconnect.

Table 3-9 shows each V.42/MNP/Buffer configuration option as it appears on the LCD.

Table 3-9
(1 of 5)
V.42/MNP/Buffer Configuration Options

Err Contrl Mode: V42/MNPorBfr
Nxt V42/MNPorBfr V42/MNPorDsc MNP_or_Buffr MNP_or_Disc BufferMode DirectMode LAPM_or_Disc LAPM_or_Buffr

This configuration option only appears if Async/Sync Mode is configured for Async.

Determines the type of error control used by the modem. In most cases, V42/MNPorBfr is the best choice. If V.42bis and MNP are enabled, then the modem uses the following priority for error control negotiation: V.42, MNP 5 and below, and Buffer Mode. Online changes do not take effect until a disconnect occurs.

V.42/MNP or Buffer – Modem attempts to connect in V.42 Error Control mode. If this fails, the modem attempts to connect in MNP mode. If this fails, the modem connects in Buffer mode and continues operation. This is also known as V42/MNP Autoreliable Mode.

V.42/MNP or Disconnect – Modem attempts to connect in V.42 Error Control mode. If this fails, the modem attempts to connect in MNP mode. If this fails, the modem disconnects. This is also known as Reliable mode.

MNP or Buffer – Modem attempts to connect in MNP mode. If this fails, the modem connects in Buffer mode. This is also known as MNP Autoreliable Mode.

MNP or Disconnect – Modem attempts to connect in MNP mode. If this fails, the modem disconnects. This is also known as Reliable mode.

Buffer Mode – Modem does not use error control and allows the DTE rate to differ from the communications line rate. This mode should only be used if the DTE provides its own error control or if errors in data can be tolerated. This setting is also known as Normal mode and is valid even if the remote modem is set for Direct mode.

Direct Mode – Modem connects at a data rate equal to or less than the initial DTE interface rate. (The modem never connects at a data rate greater than the initial DTE rate.) If the modem connects at a data rate lower than the DTE rate, the DTE must then adjust its data rate to equal the modem rate. Ultimately, the modem speed and DTE speed must be the same. Direct mode does not support error control or data buffering.

LAPM or Disconnect – Modem attempts to connect in V.42 Link Access Procedure for Modems (LAPM) error control mode. If this fails, the modem disconnects. This setting should be used for cellular connections (at both the mobile and PSTN sides) when it is known that both sides support V.42.

LAPM or Buffer – Modem attempts to connect in V.42 LAPM error control mode. If this fails, the modem connects in Buffer mode and continues operation.

NOTE: The modem must be reconfigured for Direct mode before changing the leased-line modulation if V.42 error control or Buffer mode are enabled with V.32bis on leased lines.

For Async Dial and UNIX Dial, V42/MNPorBfr is the factory default.
For Sync Dial and Sync Leased, DirectMode is the factory default.

AT command equivalent is \N*n*.

Table 3-9
(2 of 5)
V.42/MNP/Buffer Configuration Options

V42bis Compress: Enable
Nxt Enable Disable

This configuration option only appears if Async/Sync Mode is configured for Async and the Error Control Mode configuration option is set for V42/MNPorBfr or V42/MNPorDsc.

V.42bis Compression. Enables or disables V.42bis data compression.

Enable – Data compression operates in both the transmit and receive directions. This is the recommended setting for all applications.

Disable – V.42bis data compression is disabled. This is rarely needed because V.42bis data compression does not cause data expansion for compressed data.

The factory default is Enable.

AT command equivalent is ″H*n*.

MNP5 Compress: Enable
Nxt Enable Disable

This configuration option only appears if Async/Sync Mode is configured for Async and the Error Control Mode configuration option is set for V42/MNPorBfr, V42/MNPorDsc, MNP or Buffr, or MNP or Disc.

MNP5 Compression. Determines if the modem uses MNP Class 5 data compression. It can be set independently of V.42bis data compression. Online changes do not take effect until a disconnect occurs.

The factory default is Enable.

AT command equivalent is %C*n*.

EC Negotiat Bfr: Disable
Nxt Disable Enable Disab&Switch

This configuration option only appears if Async/Sync Mode is configured for Async.

Error Control Negotiate Buffer. Determines if the answering modem buffers the data that it received from the remote modem during an interval in which the modem attempts to establish a connection using error control. Online changes do not take effect until a disconnect occurs.

Disable – Data is not buffered during the link negotiating (handshaking) sequence.

Enable – Data is buffered while the link is being established. Initialization data is not passed on to the DTE during the handshaking sequence.

Disable and Switch – Data is not buffered during the handshaking sequence. However, when the modem receives an error control fallback character, it switches to Buffer mode. (See EC Fallbck Char configuration option.)

The factory default is Disable.

AT command equivalent is \C*n*.

EC Fallbck Char: 013
Nxt ↑ 013 ASCI

This configuration option only appears if Async/Sync Mode is configured for Async and EC Negotiate Buffer is configured for Disab&Switch.

Error Control Fallback Character. This configuration option allows you to enter the ASCII value of the error control fallback character. This provides the remote modem with the ability to end the error control link negotiating (handshaking) sequence by sending this character. The modems will connect in Buffer mode (no error control). Online changes do not take effect until a disconnect occurs.

When the modem receives this fallback character it switches to Buffer mode and transmits an EC fallback character to the DTE. When comparing incoming characters for a match against the EC fallback character, the modem ignores parity.

The factory default is 013.

AT command equivalent is %A*n*.

Table 3-9
(3 of 5)
V.42/MNP/Buffer Configuration Options

Flw Cntl of DTE: CTS_to_DTE **Nxt CTS_to_DTE Disable XON/XOFF**
This configuration option only appears if Async/Sync Mode is configured for Async. Flow Control of DTE. Determines how the modem controls the flow of data from the DTE. **CTS to DTE** – Method of flow control in which the modem raises and lowers its CTS interface lead to indicate when the DTE should start and stop sending data. **Disable** – The modem cannot control the flow of data from the DTE. **XON/XOFF** – Method of flow control in which the modem sends XON and XOFF characters to the DTE to start and stop the flow of data. The factory default is CTS to DTE. AT command equivalent is \Q*n*.
Flw Cntl of Mdm: Disable **Nxt Disable XON/XOFF RTS_to_Mdm**
This configuration option only appears if Async/Sync Mode is configured for Async. Flow Control of Modem. Determines how the DTE controls the flow of data from the modem. **Disable** – The DTE cannot control the flow of data from the modem. **XON/XOFF** – Method of flow control in which the modem starts and stops data flow based upon XON and XOFF characters received from the DTE. **RTS to Modem** – Method of flow control in which the modem respectively starts and stops data transmission based upon the ON and Off state of the DTE's RTS signal. The factory default is Disable. AT command equivalent is \Q*n*.
XON/XOFF Psthru: Disable **Nxt Disable Enable**
This configuration option only appears if Async/Sync Mode is configured for Async and the Flow Control configuration option is configured for XON/XOFF. XON/XOFF Passthrough. Considers an XON/XOFF character as data and passes it on to the remote modem. In this case, the DTE at one end of the communications link can send flow control characters to the other DTE. This is also known as DTE to DTE flow control. **Disable** – Flow control characters are processed but are not passed on to the remote modem. **Enable** – Flow control characters are processed and passed on to the remote modem. The factory default is Disable. AT command equivalent is \X*n*.

Table 3-9
(4 of 5)
V.42/MNP/Buffer Configuration Options

Mdm/Mdm FlowCtl: Disable
Nxt Disable Enable

This configuration option only appears if Async/Sync Mode is configured for Async and the Flow Control configuration option is configured for XON/XOFF.

Modem-to-Modem Flow Control. If a modem's buffers begin to fill due to data it is receiving from the remote modem, but is not passing on to the DTE, it can issue XON/XOFF flow control characters to the remote modem. This only applies if Buffer (nonerror control) mode is selected. If Error Control mode is enabled, flow control between the modems will happen automatically, regardless of the setting of this configuration option.

Disable – Modem does not respond to XON and XOFF characters received over the VF line. Also, the modem will not transmit an XOFF character to the remote end if its receive buffers are full.

Enable – Modem stops transmitting data to the remote modem if it receives an XOFF character over the VF line. An XON character will enable data transmission. Also, the modem will transmit an XOFF character to the remote end if its receive buffers are full. Select this setting if the DTE rate is less than the VF line rate or if the DTE must frequently stop the flow of data to process it.

The factory default is Disable.

AT command equivalent is \G*n*.

Break Buffr Ctl: Keep_Data
Nxt Keep_Data Discard_Data Discard_Brk

This configuration option only appears if Async/Sync Mode is configured for Async.

Break Buffer Control. Determines if data stored in the modem's buffer is saved or discarded when the DTE issues a break sequence.

Keep Data (Nondestructive mode) – Saves the data in the buffer in both the local and remote modems.

Discard Data (Destructive mode) – Empties the data buffer. Only buffers in the same direction of travel as the break are discarded.

Discard Break – A break received from the DTE is ignored by the modem and not sent across the link.

The factory default is Keep Data.

NOTE: This configuration option is ignored if the Break Forces Escape configuration option (see DTE Dialer configuration options group) is enabled.

AT command equivalent is \K*n*.

Send Break Cntl: Data_First
Nxt Data_First Break_First

This configuration option only appears if Async/Sync Mode is configured for Async.

Send Break Control. Determines what is sent from the modem first, data or break if a break sequence is sent from the DTE.

Data First (Nonexpedited) – A break is treated as a data character and is sent in the order it was received. This is also known as Nonexpedited mode.

Break First (Expedited) – A break is sent before the data currently in the buffer. This is also known as Expedited mode.

The factory default is Data_First.

NOTE: This configuration option is ignored if the Break Forces Escape configuration option (see DTE Dialer configuration options group) is enabled.

AT command equivalent is \K*n*.

Table 3-9
(5 of 5)
V.42/MNP/Buffer Configuration Options

TXBuffDiscDelay: 10sec
Nxt 10sec Disable 60sec

This configuration option only appears when Async/Sync Mode is configured for Async, and Error Control Mode is *not* configured for DirectMode.

Transmit Buffer Disconnect Delay. Determines how long the modem continues to transmit data stored in its Transmit buffer when the modem is commanded to disconnect by a locally attached DTE.

Disable – Modem disconnects immediately without attempting to send data stored in its buffer.

10, 60 sec – Maximum amount of time the modem tries to empty its buffer before disconnecting. In both cases (10 sec and 60 sec), the modem disconnects much sooner if it can empty its buffer.

The factory default is 10sec.

The AT command for TXBuffDiscDelay is S49=*n*.

RXBuffDiscDelay: Disable
Nxt Disable 10sec 60sec

This configuration option only appears when Async/Sync Mode is configured for Async, and Error Control Mode is *not* configured for DirectMode.

Receive Buffer Disconnect Delay. Determines how long the modem continues to send to the DTE data stored in its Receive buffer when the modem is commanded to disconnect by a locally attached DTE, or detects a line disconnect.

Disable – Modem disconnects immediately without attempting to send data stored in its buffer.

10, 60 sec – Maximum amount of time the modem tries to empty its buffer before disconnecting. In both cases (10 sec and 60 sec), the modem disconnects much sooner if it can empty its buffer.

The factory default is Disable.

The AT command for RXBuffDiscDelay is S39=*n*.

Max Frame Size: 256
Nxt 256 192 128 64 32 16

This configuration option only appears when Async/Sync Mode is configured for Async, and Error Control Mode is *not* configured for BufferMode or DirectMode.

Maximum Frame Size. Sets the maximum frame size for V.42 and MNP. For MNP operation, 64 is the minimum value. Any value less than that will automatically default to 64. For cellular applications, at least one of the sides should be set to a low value. A setting of 32 is recommended. Only one modem needs this setting; both modems will automatically default to the greatest common value.

The factory default is 256.

The AT Command for Max Frame Size is \A*n*.

CellularEnhance: Disable
End Disable Enable

This configuration option only appears when:

- **ETC is installed**
- **Async/Sync Mode is configured for Async**
- **Error Control Mode is configured for V42/MNPorBfr, V42MNPorDsc, LAPM_or_Disc, or LAPM_or Bfr**

Cellular Enhancement. When enabled, the modem uses non-standard techniques to enhance V.42 operation for cellular applications. It is still compatible, however, with modems which do not have the cellular enhancement implemented or enabled.

The factory default is Disable.

The AT command for CellularEnhance is S91=*n*.

Test

The Test configuration options determine specifics, such as the duration of a test, for the various diagnostic tests available to the modem.

Table 3-10 shows each Test configuration option as it appears on the LCD.

Table 3-10
Test Configuration Options

Test Timeout: Disable **Nxt Disable 30sec 60sec 240sec**
Test Time-out. Determines how long a test runs before aborting. **Disable** – Allows a test to run indefinitely. **30, 60, or 240 seconds** – Allows the test to run for 30 seconds, 60 seconds, or 240 seconds. The factory default is Disable. AT command equivalent is S-register S18=*n*.
Rcv Remote Loop: Enable **Nxt Enable Disable**
Receive Remote Loopback Response. Determines if the modem responds to a request for a remote loopback issued from a remote modem. The factory default is Enable. AT command equivalents are &T4 (Enable) and &T5 (Disable).

Misc

The Miscellaneous configuration options determine specifics for various functions, including network management parameters and remote modem access.

Table 3-11 shows each Misc (Miscellaneous) configuration option as it appears on the LCD.

Table 3-11
(1 of 2)
Miscellaneous Configuration Options

StrapsWhenDisc: No_Change **Nxt No_Change Reload RelodNoATChg**
Straps When Disconnected. Determines whether or not configuration options in the Active (Saved) configuration area are reloaded to Active (Operating) when a disconnect occurs. This is useful in modem pooling applications. **No Change** – Configuration options do not change upon disconnect. **Reload** – The Active (Operating) configuration area, which controls modem operation, is reloaded from the Active (Saved) configuration area when a disconnect occurs. This is useful in modem pooling applications where it is desirable to start the modem from a known condition after every call. This allows multiple users to issue AT commands to change the modem's operation for their particular call. **Reload, No AT Change** – This has the same effect as Reload, except that it becomes impossible to change this configuration option with an AT command, and the command buffer is cleared so that /A (Repeat Last Command) has no effect. **NOTE:** If Reload or RelodNoATChg is selected, the following AT commands are disabled although the OK result code appears when these commands are issued: AT&F*n*. Loads a factory default template into Active(Operating) AT&W*n*. Writes Active(Operating) to Active(Saved) or Customer 1 or Customer 2. AT&Zn=*x*. Store directory numbers Factory default templates do not affect the setting of StrapsWhenDisc. AT command equivalent is S88=*n*.
Access frm Remt: Enable **Nxt Enable Disable**
Access from Remote. Determines if your modem's SDCP can be accessed by a remote modem via the VF line. If this configuration option is disabled, the modem cannot be accessed by another modem, and the Clone to Remote feature is not available. **Enable** – Allows access from a remote modem. **Disable** – Does not allow access from a remote modem. The factory default templates do not affect Access from Remote. **NOTE:** The remote modem must be a 3800*Plus* modem. AT command equivalent is S-register S55=*n*.
RemAccssPasswrd: 00000000 **Nxt ↑ 00000000**
Remote Access Password. Allows the entry of a password for establishing control of a remote modem from the SDCP of a local modem. The same password must be used in both the local and remote modem. **NOTE:** If the Access from Remote configuration option is set to Disable, the password has no effect. AT command equivalent is the combination of S-registers S56=*n*, S57=*n*, S58=*n,* and S59=*n*.

Table 3-11
(2 of 2)
Miscellaneous Configuration Options

NetMngmtAddress: 256
Nxt ↑ 256

Network Management Address. Determines the address used when accessing a locally attached modem from the 6700 Series NMS. This configuration option is ignored by remote modems.

Address values range from 001 to 256.

The factory default templates do not affect Network Management Address.

AT command equivalent is S75=*n*.

NMS_Call_Msgs: CallCnct&Prg
Nxt CallCnct&Prg Disable CallCnctOnly CallProgOnly

NMS Call Messages. Determines if modem status and/or call summary information is sent to the 6700 Series NMS. The modem can itemize status, such as CallProgress messages, or it can report a summary of activity, such as Call Connect messages, to the NMS.

Call Connect & Progress – Enables both Call Connect and Call Progress information to be reported to the NMS.

Disable – Modem status and call summary information is not sent to the NMS.

Call Connect Only – The modem accumulates call statistics over a period of time and then reports these statistics to the NMS. The NMS uses this data to produce utilization reports.

Call Progress Only – The modem reports detailed modem status information to the NMS. These messages include any events that can display on the LCD.

The factory default templates do not affect NMS Call Messages.

AT command equivalent is S66=*n*.

NMS DTR Alarm: Disable
Nxt Disable Enable

NMS DTR Alarm. Determines whether an NMS DTE alarm report is generated when DTR is Off.

Disable – The state of DTR does not cause an alarm condition to be reported.

Enable – A DTE alarm condition is reported to the NMS controller in the Device Health & Status message if DTR is Off for more than 10 seconds. The alarm condition is reported as inactive after DTR is ON for 3 seconds.

The factory default templates do not affect NMS DTR Alarm.

AT command equivalent is S77=*n*.

NetworkPosition: Tributary
Nxt Tributary Control

Network Position Identification. Each modem must be identified either as a control modem or a tributary modem.

NOTE: This configuration option is only applicable for leased-line network management applications.

The factory default is Tributary.

AT command equivalent is S74=*n*.

CellulrRJ11Adpt: Disable
End Disable Enable

This configuration option appears only if ETC is installed.

Cellular RJ11 Adapt. Allows the modem to support an RJ11 connection to a 3-watt phone. It also causes the modem to transmit the ETC 1.1 Calling Tone during call origination.

Disable – No RJ11 support or ETC 1.1 Calling Tone.

Enable – For use when the Cellular(Mobile) factory template is loaded, enables RJ11 support and ETC 1.1 Calling Tone.

The factory default is Disable.

AT command equivalent is S93=*n*.

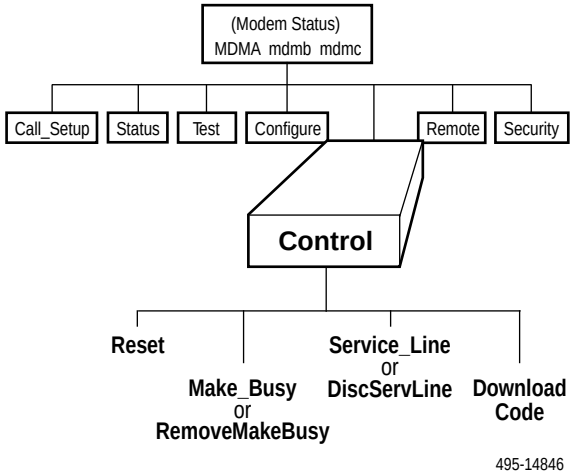
Security Configuration Options

The Security configuration options group is described in Chapter 7, *Security*.

Control Branch

The Control branch of the Top-Level menu allows you to manage hardware and software functions, such as speaker volume, reset, busy out, and firmware download. The 3821*Plus* modem has the additional hardware function, Service Line.

To access Control from the Top-Level menu, press the ▻ key until Control appears. Select Control.



Reset

Reset causes the modem to stop operation and perform a complete program restart. The modem begins the power-up test sequence that ends with the Top-Level menu displayed on the LCD. Configuration options stored in an Active (Saved) configuration area are copied to the Active (Operating) configuration area.

Make Busy or Remove Make Busy

The Make Busy function is available only on 3821-B1 models.

The Make Busy function forces the modem off-hook so it cannot answer a call. This is often used with PBX systems to permit the busy out of a PBX port for rotary or hunt groups.

WARNING

To not violate FCC and DOC regulations, this function must only be used behind a user's PBX.

Service Line or Disconnect Service Line

The Service Line function is available only on 3821-B1 models.

The Service Line function allows you to switch a specific 3821*Plus* modem installed in a COMSPHERE 3000 Series Carrier from normal dial operation to service-line operation. This switch only places the modem on the service line. For a connection to be established, you must still use the normal dialing methods as described earlier in this chapter under *Call Setup Branch* (page 3-9).

A service line is an extra dial line connected to a COMSPHERE 3000 Series Carrier. This line is normally shared by up to eight 3821*Plus* cards (24 modems) installed in either Slots 1–8 or Slots 9–16. However, by daisy chaining the service-line connector of one Network Interface Module (NIM) to the service line of another NIM installed in the same carrier, you can permit all 16 cards (48 modems) to share one service line. The service line can also be extended to other carriers in a cabinet. Only one modem may be switched to the service line at a time. For more information regarding daisy chaining of modems to the service line, refer to the *COMSPHERE 3000 Series Carrier, Installation Manual.*

Download Code

The Download Code function allows firmware to be loaded into a modem from another modem or from a DTE.

There are two selections under Download Code: Clone to Remote and To Local via DTE. Clone to Remote is used to transfer an exact copy of the firmware currently stored in a 3821*Plus* modem to another 3821*Plus* modem. For this to occur, the modem must be connected to the remote modem via a leased-line network or an established dial-line network. If these prerequisites do not exist, then this selection does not appear on the LCD.

The second selection appearing on the LCD is To Local via DTE. This function permits firmware upgrades to be transferred to a 3821*Plus* modem. This type of download requires a locally attached PC-controller to be connected to the modem's DTE port as well as special download software. **Any downloads using this selection are intended to be performed by service personnel only.**

Clone To Remote

This function allows you to transfer an exact copy of the local modem's firmware to a remote modem. Before using Clone to Remote, perform the following:

- Make sure the modems have an established dial network connection using V.34, V.32*terbo*, V.32bis, or V.32 modulation or a leased-line connection using either V.34, V.32*terbo*, V.32bis, or V.32 modulation.
- Make sure the remote modem's Access From Remote configuration option is enabled.
- Make sure the password (Remote Access Password configuration option) is the same in both the local and remote modems. (For an example of how to change the password, refer to *Editing and Saving a Configuration Option*, page 3-16.)

To access Download Code from the Control branch, make the following selections:

Press the ▻ key until Download Code appears. Press any function key to select Download Code.

Press any function key to select Clone to Remote.

At this point, if you do not want to continue this process, abort the transfer by selecting any function key. This returns the modem to the Top-Level menu.

However, to continue with the transfer, press the ▻ key to display the Reprogram Remote selection.

WARNING

Pressing any function key now begins the transfer to the remote modem. This process takes the communications link out of service for several minutes depending upon the data rate of the link (28,800 bps = 5 minutes). If the Clone to Remote process is interrupted, the remote modem is left in a partially programmed state in which its functional capabilities are limited to those required to initiate and complete another download attempt. If you cannot complete a download, call your service representative.

Press any function key (F1, F2, or F3) to begin the transfer.

The local modem's LCD displays Establish Remote, indicating the modem is attempting to establish a Remote Cloning Download session with the remote modem.

If unsuccessful, the modem remains in the Download Transfer mode. The LCD's top line displays **RemClone Failed**.

Correct the problem and attempt another download from the local modem. If this fails, contact your service representative.

As data banks are transferred, the local and remote LCD's bottom line displays the status of the download process, and the number of records sent versus the total number of records for that bank.

If the download is successful, the local modem displays **Remote Clone OK** and the remote modem displays **Frmware Upgrade**. If the download took place over the dial network, the modems disconnect when the download is complete.

To Local via DTE

This function is for use only by service personnel to transfer new firmware to 3821*Plus* modems.

Automatic Firmware Download

New releases may be available for the 3821*Plus* modem. The latest 3821*Plus* firmware is avaiable at no charge from the Automatic Firmware Download Center. Refer to page A in the front of this document for contact information.

To download the firmware, your modem must be configured for dialing. Save your modem's current configuration to the Customer 1 or Customer 2 memory area, and load the Async Dial factory template. (See *Configure Branch*, page 3-15, for information about saving and changing configuration options.)

Using your 3821*Plus* modem, dial the Automatic Firmware Download Center at **1-727-530-7026**. You may use any dialing technique (SDCP Dial, AT command, or V.25bis Call Request).

If you have a DTE (a terminal or PC) attached to your modem, informational messages are displayed on it when the modem is connected. These show the amount of time the download will take.

However, a DTE is not required. The download begins without any operator action. When the download begins, the SDCP displays download status messages with the data bank number, current block being loaded, and the total number of blocks. There are two data banks.

If the modem connects at 14,400 bps, the download takes about 10 minutes. When the download is complete, the modem resets itself and displays a normal status message (such as **Idle:33.6**).

Reload your configuration options from the Customer 1 or Customer 2 memory area that you saved them to.

Download Failure

If the download is interrupted, the modem is left in a state in which it can only be used to make or receive a call for a download.

If an interruption occurs and your modem is left in this state, repeat the download process by directing the modem to dial the Automatic Firmware Download Center. (See *Call Setup Branch*, for information about dialing a number using the SDCP.) If you are unable to complete the download, your service representative for assistance.

Remote Branch

The Remote branch is described in Chapter 6, *Remote Access*.

Security Branch

The Security branch is described in Chapter 7, *Security*.

AT Commands and S-Registers 4

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Overview

This chapter discusses guidelines necessary to operate AT commands as well as listing all AT commands supported by the 3821*Plus* modem. AT commands are issued from asynchronous DTEs.

Operating Modes

The 3821*Plus* modem has two operating modes: Command mode and Data mode. Before a modem goes online (establishes a successful connection with a remote modem), it is considered to be in Command mode, an idle state where you can modify its operating parameters or issue modem commands. (Any command issued is acknowledged with a response in either words or digits known as result codes. Refer to Table B-1 in Appendix B for a listing of result codes.)

Once the modems are online, either by answering or originating a call, they automatically switch to Data mode. Data mode is a state where any entries made from the DTE are considered data and are transmitted and received between modems. The modems remain in Data mode until the connection is broken or until they are forced into online Command mode using the escape sequence (+ + +).

Switching Between Data Mode and Online Command Mode

Sometimes it is necessary to change operating parameters while the modems are online. The Escape Sequence allows you to toggle the modem between Data mode and online Command mode while maintaining a connection with the remote modem. This is accomplished using the escape sequence (+ + +) to exit Data mode and the O command to return to Data mode.

Escape Sequence and Escape Guard Time

The escape sequence is only issued when the modem is online and in Data mode. The 3821*Plus* modem uses three consecutive plus (+) characters as the escape sequence. (To change this value, refer to S-register S2 discussed later in Table 4-2 in *S-Register List*.)

To prevent the modem from interpreting an embedded + + + in data as an escape sequence, the Escape Guard Time value determines the idle time required before and after the escape sequence is issued. The 3821*Plus* uses a 1-second pause as the Escape Guard Time. (To change this value, refer to S-register S12 discussed later in Table 4-2 in *S-Register List*.)

To enter online Command mode while in Data mode, enter the following sequence:

TYPE: + + +

Use the O command to return to Data mode from online Command mode. Enter the following command:

TYPE: ATO

PRESS: Enter

Command Guidelines

Review the following guidelines before using any AT Commands.

- The escape sequence (+ + +) is used to enter online Command mode from Data mode.
- The asynchronous character format for the AT command set must be one of the following:
  - — 8 data bits + no parity + 1 stop bit.
  - — 7 data bits + no parity + 2 stop bits.
  - — 7 data bits + parity + 1 stop bit (parity can be odd, even, mark, or space).
- All commands except A/ (repeat last command) and the escape sequence (+ + +) must begin with the characters AT and end by pressing the Enter key. The **AT** (or **at**) prefix clears the command buffer and matches the modem speed and parity to that of the DTE. Commands can be upper- or lowercase, but the modem will not recognize mixed case prefixes (At or aT).
- Commands can be entered one at a time or in strings. Strings can have up to 40 characters after the AT prefix. You can use spaces, hyphens (-), and parentheses ( ) as fillers to make the commands easier to read; the modem ignores these fillers and they are not counted among the characters which make up the command string. Commands must be entered on one line and end with the carriage return character (Enter key).
- Commands shown with the suffix *n* have several options associated with them. For example, in the L*n* command, L1 sets the speaker volume to Low and L3 sets the speaker volume to High. Omitting the suffix has the same effect as using a zero suffix; for example, ATX is equivalent to ATX0.
- The A/ command (without pressing the Enter key) causes the modem to repeat the last command entered.
- Valid commands are acknowledged with numeric or word result codes (unless the result codes have been disabled using the Q1 command).

Appendix B lists all available result codes with numeric and word equivalents.

AT Command List

AT commands are issued from an asynchronous DTE, such as a PC, and control the modem's operation and software configuration. AT commands are only applicable when the DTE Dialer Type configuration option is set for AT. (See &M*n* and &Q*n* commands.)

AT commands are entered while the modem is in Command mode and use the following format:

TYPE: AT*Xn*

Where: *X* is the AT command and *n* is the specific value for that command.

PRESS: Enter

Table 4-1 lists all AT commands supported by the 3821*Plus* modem. The Async Dial factory default is listed in **bold**.

Reference to particular country codes in this guide is not an assurance that the modem has been approved for use in that country. Consult your sales representative.

Not all commands are valid in all countries. See Appendix H.

Table 4-1
(1 of 13)
3821*Plus* AT Commands

***** – AT Command Recovery Mode**
Allows the modem to remain in Asynchronous data mode so that AT commands can be used to change the modem's current configuration. Use this command when AT commands are disabled or the modem is operating in Synchronous data mode.

This command can only be executed after the completion of a power-up self-test. Refer to *Recovering AT Commands* later in this chapter for procedures and guidelines on this command.

A/ – Repeat Last Command
Reexecutes the last command string. (Not to be preceded with AT or followed by pressing the Enter key.)

A – Answer Mode
Allows the modem to go off-hook and attempts to establish a connection without waiting for a ring.

B – ITU-T/Bell Mode

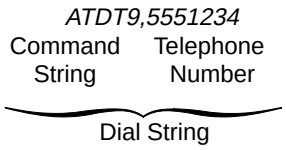
Determines the protocol used if the dial-line rate is set to 300 or 1200 bps. It has no effect if the rate is set to another value. (See %B.)

B, B0 V.21 or V.22 (300 or 1200 bps)
B1 Bell 103 or Bell 212A (300 or 1200 bps)

D*n* – Dial
Begins the dialing sequence. The dial string *n* (modifiers and telephone number) is entered after the D command.

Any digit 0–9, * , # , A, B, C, D, may be dialed as a DTMF tone. Only the digits 0–9 can be dialed in Pulse Dial mode.

The following example shows how to dial through a PBX. The dial string consists of the command string and the telephone number:



Modifiers include the following parameters:

T – Tone (DTMF) dial. Any digit 0–9, * , # , A, B, C, or D can be dialed as tone.

P – Pulse dial. Only the digits 0–9 can be dialed in Pulse Dial mode.

NOTE: Once a dialing method (tone or pulse) has been specified, it will remain active only until the end of that dial string. The factory setting is Tone dial.

, – Pause. Causes the modem to pause before processing the next character in the dial string. The length of this pause is determined by the value held in S-register S8, the Pause Time configuration option.

W – Wait for dial tone. Modem waits for a second dial tone before processing the dial string. This can be the initial dial tone or a second tone received when dialing through a tandem PBX (for example, 9W555-6789), or when invoking special features (for example, 70#W555-6789, where 70# is the local telephone company command that disables Call Waiting).

Table 4-1
(2 of 13)
3821*Plus* AT Commands

D*n*, continued

R – Reverse Dial mode. Causes the originating modem to send out an answertone once it no longer detects ringback. (Ringback is the ring you hear at the originating site when making a call.) The R parameter must be the last character in the dial string. For correct operation, at least one ringback must be detected; therefore, the remote modem should be configured to answer on the second ring or subsequent rings.

@ – Quiet answer. Wait for five seconds of silence after dialing the number. If the silence is not detected, the modem sends a NO ANSWER result to the DTE.

! – Hook flash. This causes the modem to go on-hook for 0.5 seconds, then return to off-hook.

; – Return to Command mode. Modem returns to Command mode after dialing a number without disconnecting the call. This is useful when the number exceeds 40 characters, or when the wait time between parts of a dial string is unknown.

Space, – , and ( ). These characters are ignored by the dial string and can be included in the dial string to enhance readability.

DS=*n* – **Dial Stored Number**
Dials the number stored in Location *n* (1–10). (To store a telephone number, refer to the *&Zn=x* command.)

E*n* – **Command Character Echo**
Controls whether or not characters are echoed back to the DTE when the modem is in Command mode.

E, E0	Disables echo to the DTE.
E1	Enables echo to the DTE.

H*n* – **Hook Switch Control**
Allows the modem to go off-hook or on-hook.

H, H0	Modem goes on-hook.
H1	Modem goes off-hook.

I*n* – **Identity**
Provides useful information when upgrading or servicing the product.

I, I0	Displays product code (default is 144).
I1	Displays 3-digit firmware revision number.
I2	Performs an EPROM check.
I3	Displays serial number.
I4	Displays model number.
I5	Displays hardware part number.
I6	Displays software part number.
I7	Displays the country code.
I9	Displays 3-digit firmware revision number (same as I1).
I10	Allows you to change the value displayed by I0: I10=0 causes I0 to display 144 (default). I10=1 causes I0 to display 240. I10=2 causes I0 to display 480. I10=3 causes I0 to display 960. I10=4 causes I0 to display 120.
I11	Displays the program memory checksum.
I17	Displays the last eight critical errors; the first is the most recent. (Service personnel use only.)
I19	Displays the entire firmware revision number.

O – **Return to Online or Data Mode**
Returns modem to Data mode from Online Command mode.

Table 4-1
(3 of 13)
3821*Plus* AT Commands

P – **Pulse Dial**
Sets the modem for Pulse Dial mode. See D command.

Q*n* – **Result Codes**
Result codes are informational messages (such as Connect and Ring) sent from the modem and displayed on the asynchronous DTE terminal. Refer to Table B-1 for a list of result codes.

Q, **Q0**	Enables modem to send result codes to the DTE.
Q1	Disables modem from sending result codes to the DTE.
Q2	Enables in Originate mode only for modem to send result codes to the DTE. Required for most UNIX applications.

S*n*=*r* – **Change S-Register**
Changes the contents of an S-register, where *n* is the S-register, and *r* is the new value.

S*n*? – **Display S-Register**
Displays the value of an S-register, where *n* is the S-register number.

T – **Tone Dial**
Sets the modem for Tone (DTMF) dial mode. See D command.

V*n* – **Result Codes Format**
Controls whether or not result codes appear as words or as numeric codes. Some DTEs do not recognize result codes as words; therefore, numbers are required. The Numbers (2) format is required for some modem pooling applications. Refer to Table B-1 for a list of result codes.

V, V0	Displays result codes in Number (1) format (digits).
V1	Displays result codes as text.
V2	Displays result codes in Number (2) format (digits).

Table 4-1
(4 of 13)
3821*Plus* AT Commands

X*n* – **Extended Result Codes, Dial Tone Detect, and Busy Tone Detect**
The X*n* command sets three configuration options simultaneously:

	Extended Result Codes	*Dial Tone Detect*	*Busy Tone Detect*
X0	Disable	Disable	Disable
X1	Enable	Disable	Disable
X2	Enable	Enable	Disable
X3	Enable	Disable	Enable
X4	Enable	Enable	Enable
X5	Add/EC	Enable	Enable
X6	Add/V42,MNP	Enable	Enable
X7	Use DTE Rate	Enable	Enable

EXTENDED RESULT CODES
Informational messages such as VF (line) connect rate and Error Control are displayed with the result codes.

Disable. Displays basic result codes: OK, CONNECT, RING, NO CARRIER, and ERROR.

Enable. Displays basic result codes in addition to the CONNECT rate message (for example, CONNECT 14400).

Add/EC. If error control is negotiated, attaches the /EC suffix to the CONNECT rate message.

Add/V42,MNP. Attaches the V42b, V42, MNP5, MNP4, MNP3, MNP2, or NoEC suffixes to the CONNECT rate message.

Use DTE Rate. Displays DTE data rate instead of line CONNECT rate message.

DIAL TONE DETECT
Sets the modem for dial tone detection (enable) or blind dialing (disable).

Disable. Sets the modem for blind dialing.

Enable. Sets the modem for dial tone detect.

BUSY TONE DETECT
Sets the modem to monitor for Busy Tone (Enable) or ignore Busy Tone (Disable).

Disable. Modem ignores busy tone.

Enable. Modem monitors for busy tone.

NOTE: The default and permitted settings of this option are country-dependent. See Appendix H.

Y*n* – **Long Space Disconnect**
Determines the modem's response to a continuous spacing condition sent from the remote modem when it goes on-hook. Issuing a long space is one method of disconnecting a call.

Y, Y0 Disable. Ignores long space.
Y1 Enable. Disconnects if long space is detected. Enables transmission of a long space.

Z*n* – **Reset and Load Active**

Z, Z0 Loads configuration options from Active (Saved) to Active (Operating).
Z1 Loads configuration options from Customer 1 to Active (Operating).
Z2 Loads configuration from Customer 2 to Active (Operating).
Z3 Loads configuration options from Active (Saved) to Active (Operating) and performs a reset.
Z9 Performs a full modem reset as if the modem were powered Off and ON.

Table 4-1
(5 of 13)
3821*Plus* AT Commands

″F – Clear Error Buffer
Clears the buffer where information about the last critical error is stored. For service personnel use only.

″F	Clear error buffer.

″H*n* – V.42bis Compression
Enables or disables V.42bis data compression.

″H, ″H0	Disable.
″H1	Transmit only.
″H2	Receive only.
″H3	Enable for transmit and receive.

&&P1 – Clone Remote
Copies the firmware from the modem that receives the command to another 3821*Plus* modem. The modem must be in Online Command mode. (Online Command mode is established with the +++ escape sequence.) The initial response to the command is the message Cloning Remote, or one of several error messages, such as:

NO CIRCUIT
INCOMPATIBLE MODULATION
REMOTE ACCESS DISABLED
INVALID REMOTE PASSWORD

If the cloning is successful, the messages Clone Completed and OK are sent to the DTE. If the cloning fails, the ERROR result code is preceded by an explanatory message:

Clone Aborted
Clone Failed: COMM
Clone Failed: SEQ
Clone Failed: Incompat. Config.

In the event of an error, the remote modem is placed in download-only mode, signaled by the slow flash of its MR/Pwr LED. Contact your service representative if you are unable to complete the cloning.

&C*n* – LSD Control
Line Signal Detect (LSD) is a signal indicating that the carrier signal is being received from the remote modem. It is normally turned Off to the DTE when the power level of the received carrier signal drops below the carrier detect threshold.

&C0	Forced On. LSD ON at all times.
&C1	Standard RS232. LSD is ON when the remote modem's carrier signal is detected. LSD is Off when carrier signal is not detected.
&C2	Wink When Disconnect. LSD normally forced ON, turns Off for approximately one second upon disconnecting.
&C3	Follows DTR. State of LSD follows state of DTR.
&C4	Simulated Control Carrier. State of LSD follows state of remote modem's RTS via V.13 simulated control carrier signaling. Note that the remote modem's RTS Action configuration option must be set to Simulated Control Carrier.
&C5	DTR/Disconnect Off. State of LSD follows state of DTR except upon a disconnect where LSD always turns Off. DTR must then toggle Off and ON to turn LSD ON. Use this setting for AT&T DATAKIT applications. Note that to use this configuration option, the DTR Action configuration option must be set to Stndrd_RS232 (&D1 or &D2).

Table 4-1
(6 of 13)
3821*Plus* AT Commands

&D*n* – **DTR Action**
Data Terminal Ready (DTR) is a signal from the DTE to the modem indicating that the DTE is connected and ready for operation.

&**D0**	Ignore. Modem ignores the true status of DTR and treats it as always ON.
&D1	Off=Command Mode. Modem enters online Command Mode if connected when DTR switches off.
&D2	Standard RS232. DTR Signal is controlled by the DTE.
&D3	Off=Reload Strap. Follows Standard RS232 operation, except that when DTR switches Off, the modem loads the Active (Saved) area into the Active (Operating) area.
&D4	Controls On-Hook. Follows Standard RS232 operation, except that modem does not disconnect until DTR is lowered by the DTE.
&D6	Off=Restrap to Async Dial. The factory default template Async Dial is loaded when DTR switches off.

&F*n* – **Select Factory Default Configuration Options**
Loads factory configuration options into the Active (Operating) area. &F5 and &F6 are valid only for the North America country code, and only if ETC is installed.

&F0	Async Dial
&F1	Sync Dial
&F2	Sync Leased (Answer Mode)
&F3	UNIX Dial
&F4	Sync Leased (Originate Mode)
&F5	Cellular (Mobile)
&F6	Cellular (PSTN)

&G*n* – **V.22bis Guard Tone**
Determines whether the V.22bis guard tone is disabled, set to 550 Hz, or set to 1800 Hz.

&G0	**Disable**
&G1	550 Hz
&G2	1800 Hz

NOTE: The default and permitted settings of this option are country-dependent. See Appendix H.

Table 4-1
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3821*Plus* AT Commands

&I*n* – **Dial Transmit Level for Cellular Auto**
When Dial Transmit Level Type is set to Permissive, &I*n* sets Dial Transmit Level to a value between –10 and –32 dBm. &I99 and &I100 cause the level to be varied automatically according to conditions for ETC operation. &J0 overrides this command, and is the default for North America.

&I0	–0 dBm
•	•
•	•
&I7	–7 dBm
&I8	–8 dBm
&I9	–9 dBm
&I10	–10 dBm
&I11	–11 dBm
&I12	–12 dBm
&I13	–13 dBm
&I14	–14 dBm
&I15	–15 dBm
&I16	–16 dBm (Set by &F5)
•	•
•	•
&I32	–32 dBm

&I99	Valid only if ETC is installed. Automatically adjusted according to the ETC1.0 specification. Set by &F6. Use only with remote modems set to &I99, and limit the data rate to 4800 bps (S41 = 5).
&I100	Valid only if ETC is installed. Automatically adjusted according to the ETC1.1 specification.

NOTE: The default and permitted settings of this option are country-dependent. See Appendix H.

&J*n* – **Dial Transmit Type**
Sets the power output level of the transmit signal over dial lines. The &I*n* command overrides the &J*n* command.

&J0	Permissive (–9 dBm). Valid only for North America.

&L*n* – **Leased Mode**
Sets the modem for 2-wire leased-line operation in Answer mode or in Originate mode.

&L0	Disables leased-line operation.
&L1	2-wire originate leased-line operation.
&L3	2-wire answer leased-line operation.

The &L command will cause the modem to reset before entering or exiting Leased-Line mode. Therefore, it must be entered as the last command in an initialization string.

WARNING: Do not configure the modem for leased line operation if the modem is connected to the PSTN.

Table 4-1
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3821*Plus* AT Commands

&M*n* or &Q*n* – Async/Sync Mode and DTE Dialer Type
Sets the modem for either asynchronous or synchronous operation and selects the type of dialing method the modem uses.

&M, &M0, &Q, &Q0
Modem operates in Asynchronous mode and uses AT Command protocol.

&M1, &M3, &Q1, &Q3
Modem operates in Synchronous mode and uses AT Command protocol.

&M2, &Q2
Modem operates in Synchronous mode and dials the telephone number stored in directory location 1 when the DTR signal turns Off and then ON.

&M231, &Q231
Modem operates in Asynchronous mode and disables any type of AT command dialing protocol.

&M232, &Q232
Modem operates in Asynchronous mode and uses V.25bis asynchronous dialing.

&M233, &Q233
Modem operates in Synchronous mode and uses V.25bis bisynchronous dialing.

&M234, &Q234
Modem operates in Synchronous mode and uses V.25bis HDLC dialing.

&M235, &Q235 Modem operates in Asynchronous mode and enables a subset of the AT&T command set. This is required for AT&T DATAKIT dial-out applications.

The &M2, &M231 through &M235, &Q2, and Q231 through Q235 commands disable the use of AT commands and force the modem into Dumb mode. The only way to regain control of the modem is to recover AT Commands as described in *Recovering AT Commands* section in this chapter.

&R*n* – RTS Action
Request-to-Send (RTS) is a signal from the DTE to the modem indicating the DTE has data to send to the modem.

&R, &R0 Standard RS232. DTE controls RTS to the modem in normal EIA-232-D operation. RTS must be ON for the DTE to transmit to the modem.

&R1 Ignores RTS. Modem assumes RTS is always ON. Use this selection when the DTE does not provide RTS to the modem.

&R2 Simulated Control Carrier. RTS input controls the remote modem's LSD signal. This is used for DTEs that require Line Signal Detect (LSD) to toggle ON and Off to simulate half-duplex operation.

Table 4-1
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3821*Plus* AT Commands

&S*n* – **DSR Control**
Data Set Ready (DSR) is a signal from the modem to the DTE indicating the modem is connected and ready for operation.

&S, &S0	Forced On. Forces DSR output ON constantly. This is usually used for leased-line applications and when the DTE requires DSR to always be ON.
&S1	Standard RS232. Modem controls DSR to the DTE. The modem raises DSR when it begins the handshake process. DSR lowers upon disconnect. The modem is not ready to receive data until DSR, CTS, and LSD are active.
&S2	Wink When Disconnect. DSR is normally forced ON, but is turned Off for 1 to 2 seconds upon a disconnect.
&S3	Follows DTR. When the modem receives DTR from the DTE, it sends DSR to the DTE.
&S4	On Early. DSR is low when the modem is in the idle state. DSR goes high immediately upon a command to enter Data mode. This setting is required for some modem pooling applications.
&S5	Delay to Data. Operation is similar to the Standard RS232 setting except that DSR does not turn ON until the modem enters Data mode. Normally, the modem raises DSR when it begins the handshaking process.

&T*n* – **Tests**

&T, &T0	Abort. Stops any test in progress.
&T1	Local Analog Loopback. The modem must be in Direct mode.
&T2	Pattern. Transmits and receives a 511 Bit Error Rate Test (BERT). The modem must be online and in Direct mode.
&T3	Local Digital Loopback test. The modem must be online and in Direct mode.
&T4	Enables Receive Remote Loopback Response configuration option.
&T5	Disables Receive Remote Loopback Response configuration option.
&T6	Remote Digital Loopback test. The modem must be online and in Direct mode.
&T7	Remote Digital Loopback with Pattern. The modem must be online and in Direct mode.
&T8	Local Loopback with Pattern. The modem must be in Direct mode.
&T9	Self-Test.

To start a test, set the S18 register to a desired test duration in seconds (for example, 30 seconds), and then issue the &T*n* command. Test results are displayed as the number of errors sent or received over the number of blocks sent or received.

&V*n* – **View Configuration Options**
Displays each configuration group within the Active (Operating), Active (Saved), Customer 1, and Customer 2 configuration areas as well as the telephone numbers stores in directory locations 1–10.

&V, &V0	Active (Operating) configuration options.
&V1	Active (Saved) configuration options.
&V2	Customer 1 configuration options.
&V3	Customer 2 configuration options.
&V4	Directory locations 1–10.
&V5	Status of VF line characteristics.

&W*n* – **Write (Save to Memory)**
Saves the current configuration options in Active (Operating) to one of three configuration areas:

&W, &W0	Saved to Active (Saved).
&W1	Saved to Customer 1.
&W2	Saved to Customer 2.

Table 4-1
(10 of 13)
3821*Plus* AT Commands

&X*n* – **Transmit Clock Source**
Determines the source of timing for synchronous data transmitted from the DTE.

&X, &X0	Internal. Modem provides transmit clock source for synchronous data (Pin 15).
&X1	External. Modem derives external transmit clock source provided on Pin 24 for synchronous data.
&X2	Receive Clock Loop. Modem derives transmit clock source from receive signal for synchronous data (Pin 17).

&Z*n=x* – **Store Telephone Numbers**
Modem saves the telephone number and dial command modifiers (if any) entered for *x* (up to 40 characters in length) in Directory Location *n* (1–10). The DS command dials numbers stored this way.

For example, the command AT&Z1=5551234 stores the telephone number 555-1234 into directory location 1.

To clear a telephone number from a memory location, issue the &Z*n* command without entering a telephone number.

%A*n* – **Error Control Fallback Character**
This configuration option allows you to enter the ASCII value of the error control fallback character. This provides the remote modem with the ability to end the error control link negotiating (handshaking) sequence by sending this character. The modems will connect in Buffer mode (no error control). Online changes do not take effect until a disconnect occurs.

%A*n* Where *n* is an ASCII value from 0 to 127. Factory default is 013 (ASCII carriage return).

%B*n*, %BL*n* – **Modulation/Data Rate**
Sets the modulation and maximum dial VF rate. The same function can be performed with S-register S41; the %B and %BL commands are provided for compatibility with environments where those commands are used.

The %B300 and %B1200 commands work in conjunction with the B (ITU-T/ Bell Mode) command to determine modulation.

The %B2400 through %B33600 commands set the modem for V.34 operation, and the %BL2400 through %BL19200 commands set the modem for V.22bis, V.32, V.32bis, or V.32*terbo* operation.

%B300	V.21 or Bell 103 — max. rate 300 bps
%B1200	V.22 or Bell 212A — max. rate 1200 bps
%B2400	V.34 — max. rate 2400 bps
%B4800	V.34 — max. rate 4800 bps
%B7200	V.34 — max. rate 7200 bps
%B9600	V.34 — max. rate 9600 bps
%B12000	V.34 — max. rate 12,000 bps
%B14400	V.34 — max. rate 14,400 bps
%B16800	V.34 — max. rate 16,800 bps
%B19200	V.34 — max. rate 19,200 bps
%B21600	V.34 — max. rate 21,600 bps
%B24000	V.34 — max. rate 24,000bps
%B26400	V.34 — max. rate 26,400 bps
%B28800	V.34 — max. rate 28,800 bps
%B31200	V.34 — max. rate 31,200 bps
%B33600	**V.34 — max. rate 33,600 bps**
%BL2400	V.22bis — max. rate 2400 bps
%BL4800	V.32bis/V.32 — max. rate 4800 bps
%BL7200	V.32bis — max. rate 7200 bps
%BL9600	V.32bis/V.32 — max. rate 9600 bps
%BL12000	V.32bis — max. rate 12,000 bps
%BL14400	V.32bis — max. rate 14,400 bps
%BL16800	V.32*terbo* — max. rate 16,800 bps
%BL19200	V.32*terbo* — max. rate 19,200 bps

Table 4-1
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3821*Plus* AT Commands

%C*n* – **MNP5 Data Compression**
Determines if the modem uses MNP Class 5 data compression. It can be set independently of V.42bis data compression. Online changes do not take effect until a disconnect occurs.

%C, %C0 Disable.
%C1 Enable.

+FCLASS=*n* – **Service Class Selection**
Normally set by fax software, Service Class Selection determines the fax protocol. The command is sent to the modem in the format +FCLASS=*n*, where *n* can be set to one of three values:

0 = Data

1 = Class 1 Fax (EIA 578)

2 = Class 2 Fax (EIA/TIA SP-2388 dated 20 August 1990)

In the format +FCLASS?, the +FCLASS command returns the current Service Class: 0, 1, or 2. In the format +FCLASS=?, the +FCLASS command returns the Service Classes available: 0,1, 2.

NOTE: Other fax commands supported by the 3821*Plus* modem are not documented in this manual because they are not normally issued by the user. They follow the EIA 578 and EIA/TIA SP-2388 specifications.

\A*n* – **Maximum Frame Size**
Sets the maximum frame size for V.42 and MNP. For MNP, the minimum value is 64; if a smaller value is specified, it will default to 64.

\A, \A0 64
\A1 128
\A2 192
\A3 256
\A4 32
\A5 16

\C*n* – **Error Control Negotiate Buffer**
Determines if the answering modem buffers the data that it received from the remote modem during an interval in which the modem attempts to establish a connection using error control. Online changes to this configuration option do not take effect until a disconnect occurs.

\C, \C0 Disable.
\C1 Enable.
\C2 Disable and Switch. Modem automatically switches to Buffer mode if it receives an error control fallback character (an ASCII carriage return — see %A command) during error control negotiation.

\D*n* – **CTS Control**
Clear-to-Send (CTS) is a signal from the modem to the DTE indicating that it can accept data from the DTE.

\D, \D0 Forced On. Forces CTS to always ON.
\D1 Standard RS232.
\D2 Wink When Disconnect. CTS is turned Off for 1 to 2 seconds upon a disconnect.
\D3 Follows DTR. The state of CTS follows the state of DTR.

\G*n* – **Modem to Modem Flow Control**
If a modem's buffers begin to fill due to data it is receiving from the remote modem, but is not passing the data on to the DTE, it can issue flow control messages to the remote modem. This only applies during Buffer mode connections where the remote modem also has modem-to-modem flow control enabled. If Error Control mode is enabled, flow control between the modems will happen automatically, regardless of the setting of this configuration option.

\G, \G0 Disable.
\G1 Enable.

Table 4-1
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3821*Plus* AT Commands

\K*n* – Buffer Control, Send Break Control, Break Forces Escape
The \K*n* command sets three configuration options simultaneously:

	Break Buffer Control	***Send Break Control***	***Break Forces Escape***
\K0	Discard Data	Break First	Enable
\K1	Discard Data	Break First	Disable
\K2	Keep Data	Break First	Enable
\K3	Keep Data	Break First	Disable
\K4	Keep Data	Data First	Enable
\K5	Keep Data	Data First	Disable
\K6	Discard Break	Not Applicable	Disable

BREAK BUFFER CONTROL
Determines if data stored in the modem's buffer is saved or discarded when the DTE issues a break sequence.

SEND BREAK CONTROL
Determines what is sent from the modem first, data or break if a break sequence is sent from the DTE.

BREAK FORCES ESCAPE
Determines whether or not the modem should enter Command mode when it receives a break character from the DTE.

\N*n* – Error Control Mode
Determines the type of error control used by the modem. In most cases, V42/MNPorBfr is the best choice. If V.42bis and MNP are enabled, then the modem uses the following priority for error control negotiation: V.42bis, V.42, MNP 5 and below. Online changes do not take effect until a disconnect occurs.

\N0 Buffer Mode.
\N1 Direct Mode.
\N2 MNP or Disconnect.
\N3 MNP or Buffer.
\N4 V.42/MNP or Disconnect.
\N5 V.42/MNP or Buffer.
\N6 LAPM or Disconnect.
\N7 LAPM or Buffer.

If ETC is installed, &F5 and &F6 (Cellular) set this to \N6.

Table 4-1
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3821*Plus* AT Commands

\Q*n* – Flow Control of DTE, Flow Control of Modem
The \Q*n* command controls two configuration options simultaneously:

	Flow Control of DTE	*Flow Control of Modem*
\Q0	Disable	Disable
\Q1	XON/XOFF	XON/XOFF
\Q2	CTS to DTE	Disable
\Q3	CTS to DTE	RTS to Modem
\Q4	XON/XOFF	Disable
\Q5	Disable	XON/XOFF
\Q6	Disable	RTS to Modem

FLOW CONTROL OF DTE
Determines how the modem controls the flow of data from the DTE.

FLOW CONTROL OF MODEM
Determines how the DTE controls the flow of data from the modem.

\T*n* – No Data Disconnect Timer
Forces the modem to disconnect if no data is transmitted or received within a specified amount of time.

\T, \T0 Disable. \T2 is the default for Denmark, and \T3 is the default for France and Germany. See Appendix H.
\T*n* Where *n* is a value from 1 to 255 in 1-minute increments.

\ X*n* – XON/XOFF Passthrough
The way this configuration option functions depends on how the modem is configured for flow control.

When the modem is configured for XON/XOFF flow control (see \Q*n*, Flow Control of DTE), this configuration option determines if flow control characters received from the local DTE will be passed on to the remote modem.

If configured for modem-to-modem flow control (see \G – Modem to Modem Flow Control), this configuration option determines if flow control characters received from the line will be passed on to the DTE.

\X, \ X0 Disable.
\ X1 Enable.

S-Register List

S-registers affect the operating parameters of the 3821*Plus* modem. These registers are applicable only when the DTE Dialer Type configuration option is set for AT. (See &M*n* and &Q*n* commands.)

S-registers can be displayed and/or modified when the modem is in Command mode. To display the value of an S-register, issue the following command:

TYPE: ATS*n*?

Where: *n* is the register number.

PRESS: Enter

To modify the value of an S-register, issue the following command:

TYPE: ATS*n*=*r*

Where: *n* is the register number, and *r* is the new value.

PRESS: Enter

Table 4-2 lists S-registers supported by the 3821*Plus*. Not all S-register values are valid in all countries. See Appendix H.

NOTE

In some countries, the range of allowable values of some S-registers is restricted. If the DTE attempts to enter a restricted value, the modem answers OK, but it sets the register to the nearest allowable value. The DTE can check the actual value of the register with the S*n*? command.

Table 4-2
(1 of 10)
3821*Plus* S-Registers

S0 – **Auto-Answer Ring Number** Determines the number of rings the modem will count before automatically answering a call. Enter zero (0) if you do not want the modem to automatically answer any calls. Otherwise, enter a value from 1–255 for the number of rings to count before answering. Note that if disabled, the modem can only answer with an ATA command. The factory setting is **1**. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H.
S2 – **AT Escape Character** Determines ASCII value used for escape sequence (+++) to enter Command mode from Data mode. Enter a value from 0 to 127 for the escape character. Any value greater than 127 causes the modem to disable the escape sequence. When the escape sequence is disabled, the modem cannot return to Command mode until the call is disconnected. Factory setting is **43** (ASCII + key).
S3 – **Carriage Return Character** Determines ASCII value used as the carriage return (Enter key). This character is used to end command lines and result codes. Enter a value from 0 to 127 for the command end character. Factory setting is **13** (ASCII carriage return). **NOTE:** The &W command used to save this change must be on a separate line. This ensures both that the change is intentional, and that the DTE can enter the new character.

Table 4-2
(2 of 10)
3821*Plus* S-Registers

S4 – **Line Feed Character** Determines ASCII value used as the line feed character. Enter a value from 0–127 for the line feed character. Factory setting is **10** (ASCII line feed).
S5 – **Backspace Character** Determines ASCII value used as the backspace (Backspace key). This character moves the cursor to the left and erases the previous character. Enter a value from 0–127. Factory setting is **08** (ASCII backspace).
S6 – **Blind Dial Pause** Determines how long (in seconds) the modem waits after going off-hook before dialing a telephone number if using result code X0, X1, or X3. Enter a value from 2–255 seconds. The factory setting is **2** seconds. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H.
S7 – **No Answer Timeout** Determines how long (in seconds) an originating modem waits before abandoning a call when no answer tone is received. Enter a value from 1–255 seconds. The factory setting is **45** seconds. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H.
S8 – **“,” Pause Time for the Dial Modifier** Determines how long (in seconds) the modem pauses when it encounters a comma (,) in the Dial command string. Enter a value from 0–255 seconds. The factory setting is **2** seconds. **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H.
S10 – **No Carrier Disconnect** Determines how long (in tenths of seconds) the modem allows the carrier signal to be Off before disconnecting the call. Enter a value from 0–254 in 0.1 second increments. A value of 255 disables this register. Factory setting is **20** (2 seconds). **NOTE:** The default and permitted settings of this option are country-dependent. See Appendix H.
S12 – **Escape Guard Time** Sets the value (in 20-millisecond increments) for the required pause before and after the escape sequence is issued. The guard time prevents the modem from interpreting data as the escape sequence characters. Enter a value from 0–255 in 20-millisecond increments. For example, the factory setting of 50 equals 1000 milliseconds or one second. Factory setting is **50** (1 second).

Table 4-2
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3821*Plus* S-Registers

S14 – **Asymmetric Rate Mode**
Register determines whether VF rates for transmitting and receiving are identical when using V.34 modulation. Enabling the function permits the two rates to be different.

Register has the following values:

0 = Enable
1 = Disable

Factory setting is Enable.

S18 – **Test Timeout**
Sets the duration (in seconds) for the modem tests. This automatically cancels any test in progress after the time of this register expires. Any test can be manually canceled by issuing the escape sequence (+++) followed by the &T0 command.

Enter a value from 0–255 seconds. (A value of 0 disables this register.)

Factory setting is Disable.

S26 – **RTS-to-CTS Delay**
Sets the length of time (in 10-millisecond increments) the modem waits after receiving RTS before issuing CTS to the DTE.

Enter a value from 0–255.

Factory setting is **0** milliseconds.

S39 – **Receive Buffer Disconnect Delay**
Determines the maximum amount of time the modem can continue to send data in its Receive Buffer to the DTE after the modem is commanded by the DTE to disconnect, or after the modem detects a line disconnect.

Register has the following values:

0 = Disable (Immediate disconnect)
1 = 1 second
2 = 2 seconds
• •
• •
255 = 255 seconds

Factory setting is Disable.

S40 – **Auto Make Busy**
Register determines whether the modem automatically goes into a Make Busy state in the following conditions: during a Local Analog Loop Test; during a Self Test not invoked by powering on the modem, and after a failed Self Test; during a DTE or NMS download, and after a failed download; and upon a switch to the Service Line.

WARNING: Auto Make Busy should be enabled only for modems connected to a PBX, or to a local phone system that allows it.

Register has the following values:

0 = Disable
1 = Enable

Factory setting is Disable.

Table 4-2
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3821*Plus* S-Registers

S41 – **Dial-Line Rate**
Determines the modem's highest data rate and modulation scheme for operation on dial lines. S41 can also be set using the %B and %BL commands.

Register has the following values (shown in bps):

1 = 14,400 (V.32bis)
2 = 12,000 (V.32bis)
3 = 9600 (V.32bis/V32)
4 = 7200 (V.32bis)
5 = 4800 (V.32bis/V.32)
6 = 2400 (V.22bis)
7 = 1200 (V.22)
8 = 1200 (212A; invalid for UK)
10 = 0–300 (V21)
11 = 0–300 (103J; invalid for UK)
20 = 19,200 (V.32*terbo*)
21 = 16,800 (V.32*terbo*)
27 = 33,600 (V.34)
28 = 31,200 (V.34)
29 = 28,800 (V.34)
30 = 26,400 (V.34)
31 = 24,000 (V.34)
32 = 21,600 (V.34)
33 = 19,200 (V.34)
34 = 16,800 (V.34)
35 = 14,400 (V.34)
36 = 12,000 (V.34)
37 = 9600 (V.34)
38 = 7200 (V.34)
39 = 4800 (V.34)
40 = 2400 (V.34)

Factory setting is 33,600 (V.34).

S43 – **Train Time**
Register controls the modem's train time for V.34, V.32*terbo*, V.32bis, and V.32 mode.

Register has the following values:

0 = Long (A long train is required for satellite links which have long roundtrip delays.)
1 = Short

Factory setting is Long.

Table 4-2
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3821*Plus* S-Registers

S44 – **Leased Line Rate**
Determines the modem's highest data rate and modulation scheme for operation on 2-wire leased lines in either Answer or Originate mode.

Register has the following values (shown in bps):

1 = 14,400 (V.32bis)
2 = 12,000 (V.32bis)
3 = 9600 (V.32)
4 = 7200 (V.32bis)
5 = 4800 (V.32)
6 = 2400 (V.22bis)
18 = 19,200 (V.32*terbo*)
19 = 16,800 (V.32*terbo*)
25 = 33,600 (V.34)
26 = 31,200 (V.34)
27 = 28,800 (V.34)
28 = 26,400 (V.34)
29 = 24,000 (V.34)
30 = 21,600 (V.34)
31 = 19,200 (V.34)
32 = 16,800 (V.34)
33 = 14,400 (V.34)
34 = 12,000 (V.34)
35 = 9600 (V.34)
36 = 7200 (V.34)
37 = 4800 (V.34)
38 = 2400 (V.34)

NOTE: Turn your modem off and on after setting S44 for the setting to take effect.

Factory setting is 33,600 (V.34).

S45 – **Leased Line Transmit Level**
Level determines the modem's transmit power output level over leased lines.

Enter a value from 0–15 dBm.

The factory setting is **0** dBm.

NOTE: The default and permitted settings of this option are country-dependent. See Appendix H.

S48 – **Leased Line Carrier On Level**
Determines if the modem disconnects if the carrier signal on leased lines falls below –26 dBm or –43 dBm.

Register has the following values:

0 = –43 dBm
1 = –26 dBm
2 = –33 dBm

The factory setting is **–43** dBm for all countries except France, for which it is fixed at **–33** dBm. See Appendix H.

Table 4-2
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3821*Plus* S-Registers

S49 – **Transmit Buffer Disconnect Delay**
Determines the maximum amount of time the modem can continue to send data in its Transmit Buffer to the remote modem after it is commanded by the DTE to disconnect.

Register has the following values:

0 = Disable (Immediate disconnect)
1 = 1 second
2 = 2 seconds
• •
• •
255 = 255 seconds

Factory default is **10** seconds.

S55 – **Access from Remote**
Determines whether the 3821*Plus* modem's configuration options can be accessed by a remote 3800*Plus* modem via a dial-line or leased-line connection.

Register has the following values:

0 = Enable
1 = Disable

The value of S55 is not affected by factory default templates.

S56 – **Remote Access Password** (Part 1)
Register allows entry of the first pair (leftmost) of digits of a remote access password. Any value from 00 to 99 is valid. For example, if the remote access password is 12345678, then S56=12.

The value of S56 is not affected by factory default templates.

S57 – **Remote Access Password** (Part 2)
Register allows entry of the second pair of digits of a remote access password. Any value from 00 to 99 is valid.

The value of S57 is not affected by factory default templates.

S58 – **Remote Access Password** (Part 3)
Register allows entry of the third pair of digits of a remote access password. Any value from 00 to 99 is valid.

The value of S58 is not affected by factory default templates.

S59 – **Remote Access Password** (Part 4)
Register allows entry of the fourth pair (rightmost) of digits of a remote access password. Any value from 00 to 99 is valid.

The value of S59 is not affected by factory default templates.

S62 – **V.25bis Coding**
Identifies to the modem the type of coding used by the DTE while in V.25bis HDLC or V.25bis Bisync mode.

Register has the following values:

0 = ASCII
1 = EBCDIC

Factory setting is ASCII.

Table 4-2
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3821*Plus* S-Registers

S63 – **V.25bis Idle Character**
Identifies to the modem the type of idle fill used by the DTE while in V.25bis HDLC or V.25bis Bisync mode.

Register has the following values:

0 = Mark
1 = Flag

Factory setting is Mark.

S64 – **V.25bis New Line Character**
Identifies to the modem the type of line terminator used by the DTE while in V.25bis Async mode.

Register has the following values:

0 = Carriage Return and Line Feed
1 = Carriage Return
2 = Line Feed

Factory setting is carriage return and line feed (CR + LF).

S66 – **NMS Call Messages**
Register determines if the modem sends information regarding status (Call Progress) and/or sends summarized call statistics (Call Connect) to the COMSPHERE 6700 Series NMS.

Register has the following values:

0 = Call Connect & Progress
1 = Disable
2 = Call Connect Only
3 = Call Progress Only

The value of S66 is not affected by factory default templates.

S69 – **Make Busy Via DTR**
Determines if the modem goes off-hook (busy) when DTR is Off. In the UK, the default value cannot be modified.

WARNING: The Make Busy function must be used only when the modem is connected to a PBX, or to a local phone system that allows it.

Register has the following values:

0 = Disable
1 = Enable

Factory setting is Disable.

S74 – **Network Position Identification**
Register identifies each modem as either a control or tributary modem.

Register has the following values:

0 = Tributary
1 = Control

Factory setting is Tributary.

S75 – **Network Management Address**
Register determines the modem's network address. This address is used when accessing the modem from the NMS.

Enter a value from 0 (network address 001) to 255 (network address 256).

The value of S75 is **255** when the modem is shipped. The value of S75 is not affected by factory default templates.

Table 4-2
(8 of 10)
3821*Plus* S-Registers

S76 – **Autorate (Dial Line)**
Determines if the Autorate function is used on dial lines when connected in V.32bis, V.34*terbo*, or V.34 mode. Autorate allows the modem to adjust line speed due to varying VF line quality.

Register has the following values:

0 = Enable
1 = Disable
2 = Start at 4800 bps (V.32bis only)
3 = Start at 9600 bps (V.32bis only)

Factory setting is enable.

S77 – **DTR Alarm Reporting**
Register determines whether an alarm is sent to the 6800 Series NMS controller when the DTR signal has been Off for more than 10 seconds.

Register has the following values:

0 = Disable
1 = Enable

The value of S77 is Disable when the modem is shipped. The value of S77 is not affected by factory default templates.

S78 – **Automode (Dial Line)**
If enabled, automode permits the modem to automatically connect to a remote modem using any supported modulation scheme.

If disabled, the modem only supports the modulation scheme selected by the S41 register (Dial-Line Rate).

If the modem is in a modem pool attached to a System 85 PBX, S78 should be set to 2. This modifies parameters used during connection to the PBX.

Register has the following values:

0 = Enable
1 = Disable
2 = System 85

Factory setting is Enable.

S80 – **No Data Disconnect Trigger Signal**
Register determines whether Pin 2 (transmit data) or Pin 3 (receive data) of the modem's RS-232 serial interface is monitored so that the modem can disconnect the call if there is no activity for a certain period. (See the \T command.)

Register has the following values:

0 = Transmit or Receive
1 = Transmit only
2 = Receive only
3 = Transmit and Receive

Factory setting is 3.

S82 – **Autorate (Leased Line)**
Determines if the Autorate function is used on leased lines when connected in V.32bis, V.32*terbo*, or V.34 mode. Autorate allows the modem to adjust line speed due to varying VF line quality.

Register has the following values:

0 = Enable
1 = Disable

Factory setting is Enable.

Table 4-2
(9 of 10)
3821*Plus* S-Registers

S84 – **AT Command Mode**
Determines how the modem responds to valid and invalid AT commands. The selections No ERROR and No Strap or ERROR permit installation into applications that are customized for a different modem.

Register has the following values:

0 = Normal.
1 = No ERROR. The modem executes all valid commands, ignores invalid commands, and never issues an ERROR message.
2 = No Strap or ERROR. The modem ignores all configuration commands, but always issues an OK response message.

The value of S84 is Normal when the modem is shipped. The value of S84 is not affected by factory default templates.

S85 – **Fast Disconnect**
Allows the modem to disconnect immediately after receiving a disconnect command.

Register has the following values:

0 = Disable
1 = Enable

Factory setting is Disable.

S88 – **Straps When Disconnected**
Determines if configuration options in the Active (Saved) configuration area are loaded to Active (Operating) when the modem disconnects.

Register has the following values:

0 or 231 = No Change
1 or 232 = Reload

The value of S88 is No Change when the modem is shipped. The value of S88 is not affected by factory default templates.

S89 – **V.42 ARQ Window Size Increase**
Register allows the V.42 Automatic Request for Transmission (ARQ) window size to be set to a value from 6 to 15 frames to accommodate satellite delays.

Register has the following values:

0 = Automatic Adjust (6–15 frames)
1 = 7 frames
2 = 8 frames
3 = 9 frames
• •
• •
9 = 15 frames

This command applies only to connections made using V.42bis data compression or V.42 error control.

Factory setting is Automatic Adjust.

S90 – **DTE Rate = VF Rate**
Register forces the DTE (computer) data rate to be equal to the VF (telephone line) data rate.

Register has the following values:

0 = Disable
1 = Enable

Factory setting is Disable.

Table 4-2
(10 of 10)
3821*Plus* S-Registers

S91 – **Cellular Enhancement** Valid only if ETC is installed. Register determines whether parameters are set to improve performance over a cellular link. Should be enabled when the remote modem is using a cellular connection. Register has the following values: **0** = Disable 1 = Enable Factory setting is Disable.
S93 – **RJ11 Cellular Adapt** Valid only if ETC is installed. Register controls support for an RJ11 connection, including generation of the ETC 1.1 Calling Tone during call origination. **0** = Disable 1 = Enable Factory setting is Disable.

Recovering AT Commands

Certain dialing methods, such as V.25bis and synchronous operation, disable the use of AT commands and place the modem into a state known as Dumb mode. The 3821*Plus* is capable of normal operation when in Dumb mode. Moreover, the SDCP normally can be used to load the Async Dial factory default and restore the use of AT commands. However, if an SDCP is for some reason unavailable, the following procedure may be used.

The AT Recovery command (AT***) places the modem into a temporary state that restores AT commands. When in this state, the modem's previous settings are retained except for the following configuration options:

- The DTE Dialer Type configuration option (&M and &Q) is set to AT
- The Async/Sync Mode configuration option (&M and &Q) is set to Async
- The DSR Control configuration option (&S) is set to Forced On
- The LSD Control configuration option (&C) is set to Forced On

If these settings are not appropriate, then change them to a setting compatible with your current application.

The procedures for an AT recovery using an asynchronous terminal or personal computer are listed in the following section. Read through these procedures before performing a recovery:

▶ Procedure

1. Turn the modem Off and then ON. The modem performs a power-up self-test in which all LEDs light. While this is running, repeatedly press the A key of your DTE's keyboard (or keep the key depressed if your keyboard automatically repeats characters that way). Keep doing this until A's (or a's) appear on your DTE screen. (You may use all uppercase or all lowercase characters.)

   At least three consecutive A's must be entered within a 2-second time interval.

   If these characters are not echoed back to the DTE screen after the power-up self-test is complete, then the modem is still in Dumb mode and maintains its current configuration. Turn the modem Off and then ON again, and repeat Step 1.

2. Once the characters are echoed back to the DTE,

   TYPE: T***

   (The case of this character must be consistent with the case used in Step 1. Mixed case prefixes such as aT or At are not recognized.)

   This must be entered within 10 seconds after receiving the echoed characters.

   PRESS: Enter

   The screen displays **OK**.

   The modem is now in AT Recovery mode, and remains in this state until a Save or power reset occurs. While in this mode, you can use AT commands to make any necessary changes to configuration options.

   Keep in mind that the &C command is changed to Forced On (&C0), the &M and &Q commands are changed to Async mode with AT commands enabled (&M0 and &Q0), and the &S command is changed to Forced On (&S0). If these settings are not appropriate, then reset them to a desired choice before exiting AT Recovery mode.

3. To save changes, use the &W command:

   TYPE: AT&W*n*

   Where: *n* is one of the following storage areas:

   0 for Active (Saved)
   1 for Customer 1
   2 for Customer 2

   PRESS: Enter

   The modem exits AT Recovery mode and returns to its previous application environment. Only the Active (Saved) area affects modem operation. To move a Customer area to Active (Saved), use the Z command.

Initialization Strings

An initialization string contains several AT commands that are entered at once to program the modem for a specific application.

The following initialization strings identify essential AT commands that directly impact modem operation for a particular application. If you need to modify these strings for your application, make sure additional commands are inserted somewhere in the middle of the initialization string. Whenever an &L command is used, it must appear at the end of an initialization string.

V.25bis Applications

For V.25bis HDLC (High-level Data Link Control) dial-line operation, create an initialization string with the following commands. Note that the character format can be 8 data bits, no parity, and 1 stop bit; 7 data bits, odd parity, and 1 stop bit; or 7 data bits, even parity, and 1 stop bit:

TYPE: AT&F &D1 &S1 &M234 &W

PRESS: Enter

For V.25bis bisync operation, create an initialization string with the following commands. Note that the character format must be 7 data bits, odd parity, and 1 stop bit:

TYPE: AT&F &D1 &S1 &M233 &W

PRESS: Enter

Synchronous Leased-Line Applications

For synchronous leased-line operation, create the following initialization string with the following commands:

TYPE: AT&F &D1 &S1 S44=*n* S45=*n* S82=*n* &M1 &W &L*n* &W

Where: *n* is the value for the AT command. Refer to either Table 4-1 or Table 4-2 to determine the best possible values for these commands.

PRESS: Enter

AT&T Exclusive Dialing for DATAKIT Applications

For AT&T exclusive dialing for DATAKIT applications, create an initialization string with the following commands:

TYPE: AT&F &C5 &D1 &S3 &R0 \D3 \Q1 \G1 S85=1 &M235 &W

PRESS: Enter

Fax Operation 5

Overview 5-1
Fax Operation 5-1

Overview

The procedures for sending and receiving facsimile documents with your modem depend on the fax software you use. This chapter does not contain specific procedures, but rather information that may make it easier for you to use the documentation that came with your fax software.

Fax Operation

Your modem, in combination with your computer and fax software, is capable of emulating the functions of a fax machine. You can use it to send and receive fax files in communication with another fax modem, or with a standard fax machine. These fax files are images turned into the sort of data that can be stored in your computer.

Fax machines and fax modems use special protocols different from those used by standard modems. The device you intend to communicate with must be compatible with your modem, which means that it must be capable of using the same protocol. Your 3821*Plus* modem supports Class 1 (EIA 578) and Class 2 (EIA/TIA SP-2388) Group III fax, using V.17, V.29, or V.27ter modulations.

Before you can send or receive a fax, the following must be true:

- Your modem must be online with a compatible fax modem or fax machine.
- You must have fax software installed on your computer.
- You must have configured your modem according to the specifications of your fax software manual. For example:
  - — Some fax software requires that the modem have Auto-Answer disabled. You can set this with the ATS0=0 command.
  - — Some fax software requires that the modem use software flow control. You can set this with the AT\Q*n* command.
  - — DTR Action should be set for standard RS232-D operation. Use the AT&D2 command.
  - — LSD (Line Signal Detect) Control should be set for standard RS232-D operation. Use the AT&C1 command.

If your fax software requires that you change the configuration of your modem, see the appropriate sections of Chapter 4, *AT Commands and S-Registers*.

Your fax software uses AT commands to tell the modem what to do. These commands, and the replies your modem makes (such as “OK”), may be displayed on your computer terminal during fax operation, but this depends on your software. You do not have to issue AT commands yourself, unless you use AT commands to configure the modem.

For more information about fax operation, see the manual that came with your fax software.

Remote Access 6

Overview 6-1
Remote Access 6-1

Overview

The Remote Access feature of 3821*Plus* modems allows you to change configuration options and control test functions in a remote 3821*Plus* modem from any COMSPHERE 3800, 3800*Plus*, or 3900 Series modem with a Diagnostic Control Panel (DCP) or a Shared Diagnostic Control Panel (SDCP). Remote access is only available when using V.34, V.32*terbo*, V.32bis, or V.32 modulation schemes.

Remote Access

The following conditions must be met before using Remote Access:

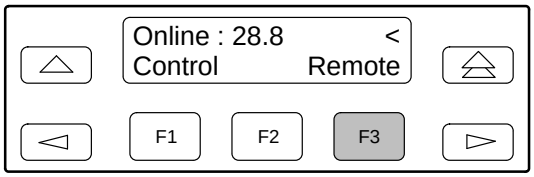
- A connection using either the dial network or leased lines must be established.
- The Access from Remote configuration option must be enabled in the remote 3821*Plus* modem (S55 = 0).
- The Remote Access Password configuration option must be the same for both the local and remote modems (S56–S59).

Remote access is accomplished using either the primary or secondary channel of the VF line. Using the primary channel gives a much faster response time due to the higher data rate, but it also interrupts data flow because primary data is stopped when Remote mode is active. Once Remote mode is terminated, the primary channel is automatically made available to data transmission.

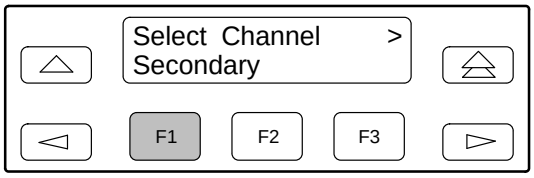
Unlike primary channel communications, the secondary channel operates at a slower data rate and does not interrupt data flow.

To access the Remote branch of the COMSPHERE modem menu structure, make the following selections:

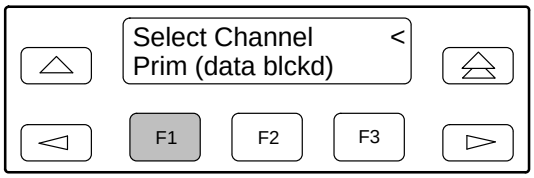
Press the ▻ key until Remote appears. Select Remote.



To operate over the secondary channel, press any function key to select the secondary channel.



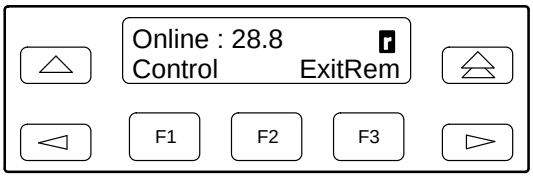
To operate over the primary channel, press the ▻ key until Prim appears, and press any function key.



NOTE

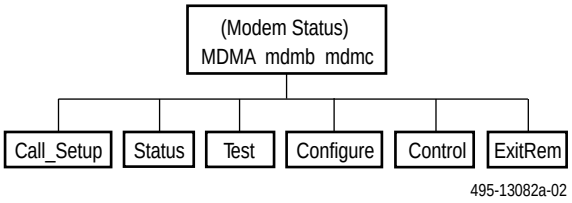
If a connection is not established between a local COMSPHERE modem and a remote 3821*Plus* modem, the LCD displays **Remote Mode Fail – No Circuit**. Press any key to return to the Top Level menu, and dial again.

If the remote modem accepts the password and the entry is successful, the Top-Level menu of the remote modem appears on the local modem's LCD. An r appears in the upper right-hand corner indicating that what is displayed on your LCD is actually the Top-Level menu of the remote 3821*Plus* modem.



The Top-Level menu of the remote 3821*Plus* modem is similar to the local COMSPHERE modem with the following exceptions:

- The Modem Select branch (mdma, mdmb, mdmc) is displayed, but cannot be used to select modems. The modem under remote control is shown in uppercase characters.
- Change Directory is the only function available under the Call Setup branch.
- Self-Test and Local Analog Loop do not appear under the Test branch when using the secondary channel. When using the primary channel, the Test branch does not appear.
- In the Control branch, Make Busy is not available.
- The Security Branch is not available.
- Exit Remote replaces Remote on the local modem's LCD.



To return to local modem operation, select ExitRem. Any changes made to configuration options while using the Remote branch are not saved until you exit the Remote branch.

The following conditions can cause Remote Access to fail:

- The local modem is not able to communicate with the remote modem because of a poor dial network or leased-line connection, or the remote modem is not a 3821*Plus* modem. If this is the case, the status message **No Response** appears on the LCD.
- If a connection is established but the remote modem's Access from Remote configuration option is disabled, then the status message **Access Disabled** appears on the LCD.
- If a connection is established but the wrong password is stored, the status message **Password Invalid** appears on the LCD.

Security 7

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Overview

Security configuration on the 3821*Plus* modem is performed with the SDCP, using the Security branch and the Security configuration options under the Configure branch.

Password Types

Security in 3821*Plus* modems is implemented with three basic types of passwords.

Administration Password

There is one **Administration Password** which permits access to the password list and other security configuration options. When the modem is shipped the Administration Password is 00000000. The Reset Security command of the Security branch changes the Administration Password to the value shown on the last page of this manual. It also can be changed with the Set Administration Password command under Set Access Control in the Security branch.

To enter your Administration Password from the SDCP:

▶ Procedure

1. Select Set_Access_Ctrl from the Security branch. **Admin Password?** appears. This occurs every time you enter the Security branch.
2. Select the F2 (↑) key to increment password values.
3. Press the ▻ key to move the cursor to the next position. Continue this sequence until the full Administration Password value appears and then press F1 (Ent). If the correct value is entered, the EditPassWdTable group appears on the LCD.

Press the ▻ key to scroll the Set Answer Security, Set Originate Security, and Set Administration Password groups into view.

If an incorrect Administration Password is entered, then the message **PassWrd Invalid** appears as well as the last password entered. Enter the correct password value or press the △ or ⏫ key to exit the Security branch.

VF Passwords

VF passwords consist of DTMF tones and are entered by the originating caller using the AT Dial (D) command, or the keypad of an attached telephone. They must consist of eight decimal digits, 0 through 9, and are terminated with the # symbol. For example, if 11223344 is a valid VF password on the 3821*Plus* modem at the telephone number 555-4321, it can be accessed with this command:

ATDT555-4321@11223344#

If pulse dialing must be used, the VF password must still be sent in DTMF tones. This can be done using a combination of P (pulse) and T (tone) dial modifiers:

ATDP555-4321TW11223344#

The requirement of the @ (wait for quiet answer) or W (wait for second dial tone) dial modifier depends on the VF_Prompt_Type selected in the Security configuration options group of the Configure branch. For more information about dial modifiers, see the Dial (D*n*) command.

DTE Passwords

DTE passwords are entered by the originating caller from the DTE keyboard. They may consist of six characters, and may be a combination of decimal digits 0 through 9 and the letters A through Z (uppercase or lowercase).

Up to 3,000 VF and DTE passwords can be stored in the password table in the memory of the 3821*Plus* modem. Each password is indexed by a number, 0001 through 3000. The index number is used when displaying or changing a password.

Originate Security

An Originate Access password is entered by a local user to gain access to a local 3821*Plus* modem. This password must be embedded in the AT dial command. The password must be defined as a DTE_Entry type in the password table.

The following example describes how to enter an Originate Access security password:

TYPE: **ATD%C2C3D2%T18135551234**

Where: **ATD** is the AT dial command.

% is the start and stop dial string command interrupt characters; the Originate Access password must be enclosed by these characters.

C2C3D2 is the alphanumeric 6-character Originate Access password on the local modem.

T is the Tone (DTMF) dial modifier.

18135551234 is the phone number of a remote modem.

PRESS: Enter

Answer Security

DTE passwords alone, or a combination of both VF and DTE passwords, may be used for Answer Security.

With **VF *and* DTE** Security, modems negotiate VF password entry before training. If successful, the modems connect and then prompt the user for a valid DTE password.

Another combination is called **VF *with* DTE** Security. In this case, the modem will accept as valid only the DTE password whose password table entry immediately follows that of the VF password that was received. For example, if the VF password at index number 9 is used to connect, the DTE password at index number 10 is the only valid DTE password.

The Password Type option of the EditPassWdTable group determines whether VF and DTE Security or VF with DTE Security is used.

Callback Security

Callback Security causes the responding modem to disconnect and call back to the phone number provided by the user at the originating modem. The user enters the number, when prompted by the remote modem, as a Directory location 1–10 preceded by the # sign, or as a complete telephone number (including the pause and wait dial modifiers). For example:

#1 Directs the remote modem to call back to the number stored in Directory 1

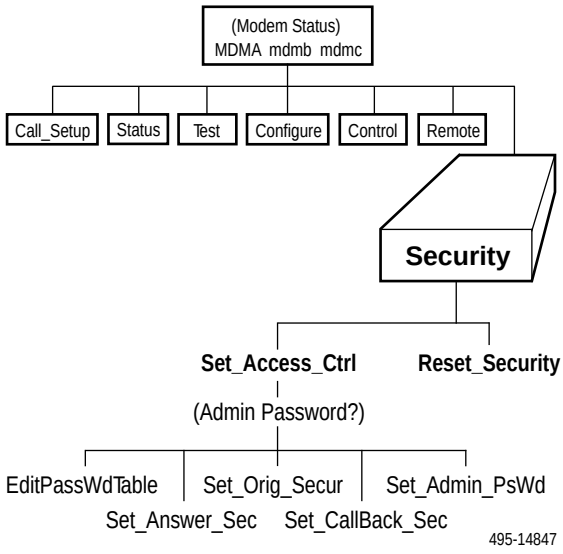
#10 Directs the remote modem to call back to the number stored in Directory 10

9W18005551234
Directs the remote modem to dial 9, wait for dial tone, and call back to 1-800-555-1234

If an invalid directory or telephone number is entered but the password is correct, the modem will stay online but will not conduct a callback sequence. The modem also will not initiate a callback if no directory or telephone number is specified.

Security Branch

The Security branch of the Top-Level menu allows you to change and save parameters that are critical to the dial access security password database. Most of the functions within this branch are protected by the Administration Password. Once the correct password is entered, these security functions appear on the modem's LCD. The major functions that appear under the Security branch are Set Access Control and Reset Security.



Set Access Ctrl

Set Access Control contains the Edit Password Table, Set Answer Security, Set Originate Security, Set Callback Security, and Set Administration Password configuration groups.

EditPassWdTable

The Password Table is the modem's security database. It contains all essential information for each password stored in the modem's nonvolatile memory. The information associated with each password is known as a record. Records are identified by an index which is a numeric name for a single record. A password's record is retrieved by entering its index.

The Edit Password Table group allows you to view and/or change the modem's security database table. To do this, you must retrieve a password's records by selecting its index. (See *Select Index*.)

The Edit Password Table group consists of the following options: Select Index, Password Type, Edit Password, and Save Edit.

To access EditPassWdTable from Set Access Ctrl, select EditPassWdTable.

Select Index

Select Index allows a specific record to be retrieved. Index addresses range from 0001 to 3000. The contents of this record can be viewed, edited, and saved.

Select Index appears. Press the F2 (↑) key to increment index values. Press the ▻ key to move the cursor to the next position.

Continue this sequence until the desired index appears, and then press Ent.

If an index outside of the range is entered, the message **Index Too Big** appears. Choose an index from the database's current index range.

After selecting an index, the Edit Password Table group's options (Password Type, Edit Password, and Save Edit?) appear in a series of LCD displays.

Table 7-1 describes the settings of the Edit Password Table group options.

Table 7-1
(1 of 2)
Edit Password Table Group Options

PsWdType xxxx **Nxt Cleared DTE Entry VF_Entry VF_plus_DTE**
Password Type. Indicates whether this index location is configured for VF-side password, DTE-side password, or both. Cleared displays for an index location that contains no valid entry. Note that this option only identifies the type of password used. For proper operation, the type of password selected must be consistent with the type of security used. Refer to the Set Answer Security group option found later in this chapter.
xxxx – Indicates the selected index location.
Cleared – Indicates that the index location does not contain any valid selections and is currently unused.
DTE Entry – Indicates that this index's password is configured for DTE-side password entry. Special requirements apply when using DTE passwords if the Set Answer Security option (Answer Security mode) is set to VF_&_DTE or VF_w/_DTE. Refer to the note following VF plus DTE.
VF Entry – Indicates that this index's password is configured for VF-side password entry. This selection requires that the Set Answer Security option (Answer Security mode) be set to VF_&_DTE.
VF plus DTE – Indicates that both layers of password entry are used with this index's password. This location is configured so that the answering modem sends a prompt for the DTE-side password after receiving a valid VF-side password. This setting requires that the Set Answer Security option be set to VF_&_DTE or VF_w/_DTE.
NOTE: If the Set Answer Security option (Answer Security mode) is set to VF_&_DTE or VF_w/_DTE, special requirements apply in order to use passwords with their type set to DTE_Entry. The originating caller must first enter a valid VF password. If the VF password entered is configured in the security database with the type VF_plus_DTE, the user is then required to enter a password configured in the database table with the type DTE_Entry. In the case of VF_w/_DTE mode, the DTE Entry password must immediately follow the VF_plus_DTE password in the password table.

Table 7-1
(2 of 2)
Edit Password Table Group Options

Edit PsWd xxxx **Nxt ↑ yyyyyyyy or zzzzzz**
Edit Password. Allows the password associated with this index to be changed. **NOTE:** This security option does not appear if the Password Type option is set for Cleared. **xxxx** – Indicates the current index location value. **yyyyyyyy** – Indicates the current password value for this index. If the Password Type is VF_Entry or VF_plus_DTE, then the password value is an 8-digit decimal number. **zzzzzz** – Indicates the current password value for this index. If Password Type is configured for DTE_Entry, then the password value is a 10-character alphanumeric number.
Save Edit? xxxx **Edit Save Yes No**
Save Edit. Saves any changes made in the EditPassWdTable group. **xxxx** – Indicates the current index field value. **Edit** – Returns the LCD to the Password Type option and does not save any changes made to the index or password table. **Save** – Saves changes made to the index or Password Table. Once selected, the Select Index screen appears and increments to the next index value. **Yes No** – Appears only if changes are made to any of the options within the Password Table and the ◁ or △ key is pressed before reaching the Save Edit? option. After deciding whether or not to save changes, the LCD displays Select Index and increments to the next index value.

Set Answer Sec

Set Answer Security determines if dial access security is enabled or disabled. This method of inbound security is configured in the answering modem. Although this also appears under the Security Configuration Option group, it can only be changed from the Set Answer Sec LCD display in the Security branch.

To access Set_Answer_Sec from Set Access Ctrl, make the following selections:

- Press the key until Set_Answer_Sec appears.
- Select Set_Answer_Sec.

Table 7-2 describes the settings of the Set Answer Security group option.

Table 7-2
Set Answer Security Group Option

Set Answer Sec: No_Answ_Sec **No_Answ_Sec DTE_Only VF_&_DTE VF_w/_DTE**
Set Answer Security. Is the primary method for enabling or disabling the dial access security function. **No Answer Security** – Disables the dial access security feature. **DTE Only** – The answering modem is enabled for security. The originating user must supply a password when prompted. Note that a call attempt never enters data mode if the answering modem is configured for DTE_Only and the originating caller attempts to enter a password using only the VF-side password entry technique. **NOTE:** In modem pooling applications where modems are connected to a multiline hunt group (rotary), all modems must have this configuration option set to the same value. **VF_&_DTE** – The answering modem is enabled for security. The modems negotiate security using the VF-side password entry technique protocol. If successful, and the Password Type for this particular VF password is set for VF_&_DTE, a password is requested from the originating user. If successful, the modems connect and can pass data. **NOTE:** A call attempt fails if the answering modem is configured for VF_&_DTE and the originating caller does not first enter a VF-side password. **VF_w/_DTE** – Allows specification of related VF-Side and DTE-side password pairs. In this configuration, a DTE-side password submitted must be a valid Password Table entry, and must match the particular entry associated with the valid VF-side password that was submitted. The passwords are associated with each other by their index in the Password Table: VF_plus_DTE passwords occupy odd-numbered index locations; their DTE_Entry counterparts occupy the even-numbered index locations that immediately follow. So, for example, if a VF-side password is entered that matches the entry in index location 11, the DTE-side password subsequently entered must match the entry in index location 12. VF_plus_DTE passwords must be unique in a VF_w/_DTE configuration. An attached DTE in asynchronous operation is required for DTE-side password entry. Up to 10 password pairs are permitted. (This can be optionally increased with the Expanded Password Table feature, which permits 1500 password pairs.)

Set Orig Secur

Set Originate Security controls whether or not the modem can originate a call using AT commands when the dial access security feature is installed. This method of outbound security only applies to modems originating a call.

To access Set_Orig_Secur from Set Access Ctrl, press the ▻ key until Set_Orig_Secur appears. Select Set_Orig_Secur.

Table 7-3 describes the settings of the Set Originate Security option.

Set CallBack Sec

For an extra level of security, a modem can be directed to call back to a dial-in user after the modem validates the DTE password. The user, prompted for the callback number, supplies this either as a complete phone number or as a directory number.

Table 7-4 describes the settings of the Set Callback Security option.

Table 7-3
Set Originate Security Group Option

Set Orig Secur: No_OrigSec **No_OrigSec EnaOrigSec**
Set Originate Security. Controls the security protection for origination of calls when AT commands are used.
The originate password must be included in all AT dial command strings if this configuration option is enabled. If not included, or incorrectly entered, the message **ERROR** is returned to the DTE. The Originate Security password must be defined as a DTE_Entry password type.
No Originate Security – Disables originate security so that a modem can originate a call using AT commands.
Enable Originate Security – When using AT commands, the modem will only place a call if a valid password is entered along with an AT dial command. If the password is not entered, then **ERROR** is returned to the DTE, and the dial command is canceled.

Table 7-4
Set Callback Security Group Option

Set CallBack Sec: No_CallBack **No_CallBack Ena_CallBack**
Set Callback Security. Determines whether the modem will call back after the answering modem has verified the DTE password.
Callback security is valid only if Answer Access security has been enabled with a password type of DTE.
No_CallBack – Disables callback security.
Ena_CallBack – Callback is performed after the modem validates the user-supplied DTE password.

Set Admin PsWd

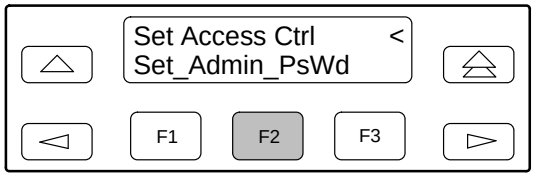
Set Administration Password is used to change the Administration Password value.

NOTE

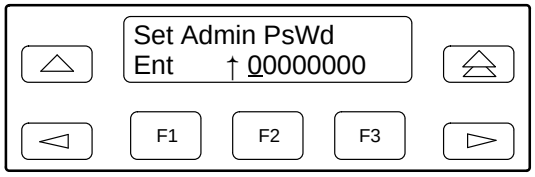
If this value is forgotten, then the only way to access any of the security functions is by selecting Reset Security. This restores the password to a known value*, but erases the contents of the modem's security database.

▶ Procedure

1. Press ▻ until Set_Admin_PsWd appears.
2. Select Set_Admin_PsWd.



The Administration Password appears.



3. Press the F2 (↑) key to increment password values.
4. Press the ▻ key to move the cursor to the next position. Continue this sequence until the new password value is entered.
5. Press the F1 key to save the new password value.

Reset Security

Reset Security is the second major function within the Security branch of the Top-Level menu. It erases all contents of the security database table and resets all index locations to Cleared. Two selections appear under Reset Security: Abort Security Reset and Erase All PassWords. Use Reset Security if you want to redo the entire security database table.

CAUTION

This function can be used as a last resort if the Administration Password is no longer known. This function causes the Administration Password to default to the Reset Default password, and erases the contents of the database table.

▶ Procedure

1. To reset security from the main menu, press ▻ until Security appears. Press ▻ until Reset_Security appears.
2. Press ▻ until Reset_Security appears.
3. Press F1, F2, or F3 to select Reset_Security.

   To abort this function, select Abort_Sec_Reset. Nothing is erased and the LCD returns to the main security display.
4. To reset security, press ▻ until Erase_All_PassWd appears on the LCD.
5. Select Erase_All_PassWd.

The entire security database is erased and the Administration Password defaults to the Reset Default password value. This value appears as a single number on the last page of this document.

* This value appears as a single number on the last page of this document.

Security Configuration Options

The Security Configuration Options group under the Configure branch allows you to view and set dial access security parameters.

Table 7-5 shows each Security configuration option as it appears on the LCD. The factory default value is shown after the colon (:) on the first line; all available selections are listed on the second line.

Table 7-5
(1 of 3)
Security Configuration Options

EntryWait_Time: 20 sec **Nxt 20 sec 10 sec 40 sec 60 sec**
Entry Wait Timeout. Determines how long the answering modem waits for the originating modem to enter a VF-side password and DTE-side password. This timer resets for each phase of access security. For example, if a VF-side password and a DTE-side password are required, then the user has 20 seconds per entry to provide the correct password. The factory default is 20 seconds.
VF_Prompt_Type: 2nd_DialTone **Nxt 2nd_DialTone Quiet_Answer**
VF Prompt Type. Determines how the answering modem requests a valid password from the originating modem for the valid password. This configuration option is only used for VF-side password entry and is not valid for DTE-side password entry. **NOTE:** This configuration option only appears if the Answer Security Mode configuration option is configured for VF_&_DTE or VF_w/_DTE. **2nd Dial Tone** – Once the answering modem is off-hook, it generates a dial tone to the originating modem as a prompt for that modem's VF-side password. (Wait for Second Dial Tone is represented by a W in the dial command string.) **Quiet Answer** – Once the answering modem is off-hook, it does not send an answer tone to the originating modem. The originating modem enters its VF-side password after detecting a ring back signal followed by five seconds of silence. For this to work correctly, the Auto Answer Ring # configuration option in the answering modem must be set to 2 rings or greater. (Wait for Quiet Answer is represented by an @ in the dial command string.) The factory default is 2nd_DialTone.
#DTE_PW_Tries: 1 **Nxt 1 2 3 4 5**
Number of DTE Password Tries. Determines the number of attempts an originating user has to enter a valid DTE-side password. If the password entered does not match a value in the answering modem's Password Table, then the modem will issue the password prompt again (provided that the number of tries is set to a value greater than 1). This will continue until the correct password is entered by the originating user or the number of tries allowed is met. The factory default is 1.

Table 7-5
(2 of 3)
Security Configuration Options

DTE_PW_TermChar: 013 **Nxt ↑ 013**
DTE Password Termination Character. Allows you to change the ASCII character used to indicate the end of a password or User ID entered by an originating user. This character can be set to any ASCII value from 1 to 63 or 123 to 127. The factory default is 13 (ASCII carriage return).
DTE_PW_BkSpChar: 008 **Nxt ↑ 008**
DTE Password Backspace Character. Sets the character that is used to perform a backspace in security mode. This character can be set to any ASCII value from 1 to 63 or 123 to 127. The factory default is 08 (ASCII backspace).
Get_User_ID: Disable **Nxt Disable Enable**
Get User ID. Determines whether the remote user is prompted for an NMS-defined logon ID once the modems have completed initial handshaking. For consistent operation from the remote user's viewpoint, all modems in a modem group must use the same setting. **Disable** – The user is prompted only for a password (if required by the setting of Answer Security Mode or the configuration of the VF-side password). **Enable** – The user is prompted for a login ID and then a password (if required by the setting of Answer Security Mode or the configuration of the VF-side password). NMS sends a disconnect command to the local modem if the login ID is invalid. The factory default is Disable.
NMS_Reporting: 00 **Nxt ↑ 00**
NMS Reporting. Determines whether and how dial access security events are reported to the NMS controller. The possible values, 00–15, represent a bit map. The bits are normally set using the NMS controller. The value of NMS_Reporting is not affected by loading a factory default template. The initial value when the modem is shipped is 00.
Answer_Secur: No_Answ_Sec **Nxt No_Answ_Sec DTE_Only VF_&_DTE VF_w/_DTE**
Answer Access Security Mode. This configuration option is read-only and cannot be changed from the Configure branch; it can be changed only from the Security branch. The setting of Answer Security determines the type of access security protection provided by the modem. It can be disabled using the No_Answ_Sec setting, or it can be enabled with the DTE_Only, VF_&_DTE, or VF_w/_DTE settings. The factory default is No_Answ_Sec.

Table 7-5
(3 of 3)
Security Configuration Options

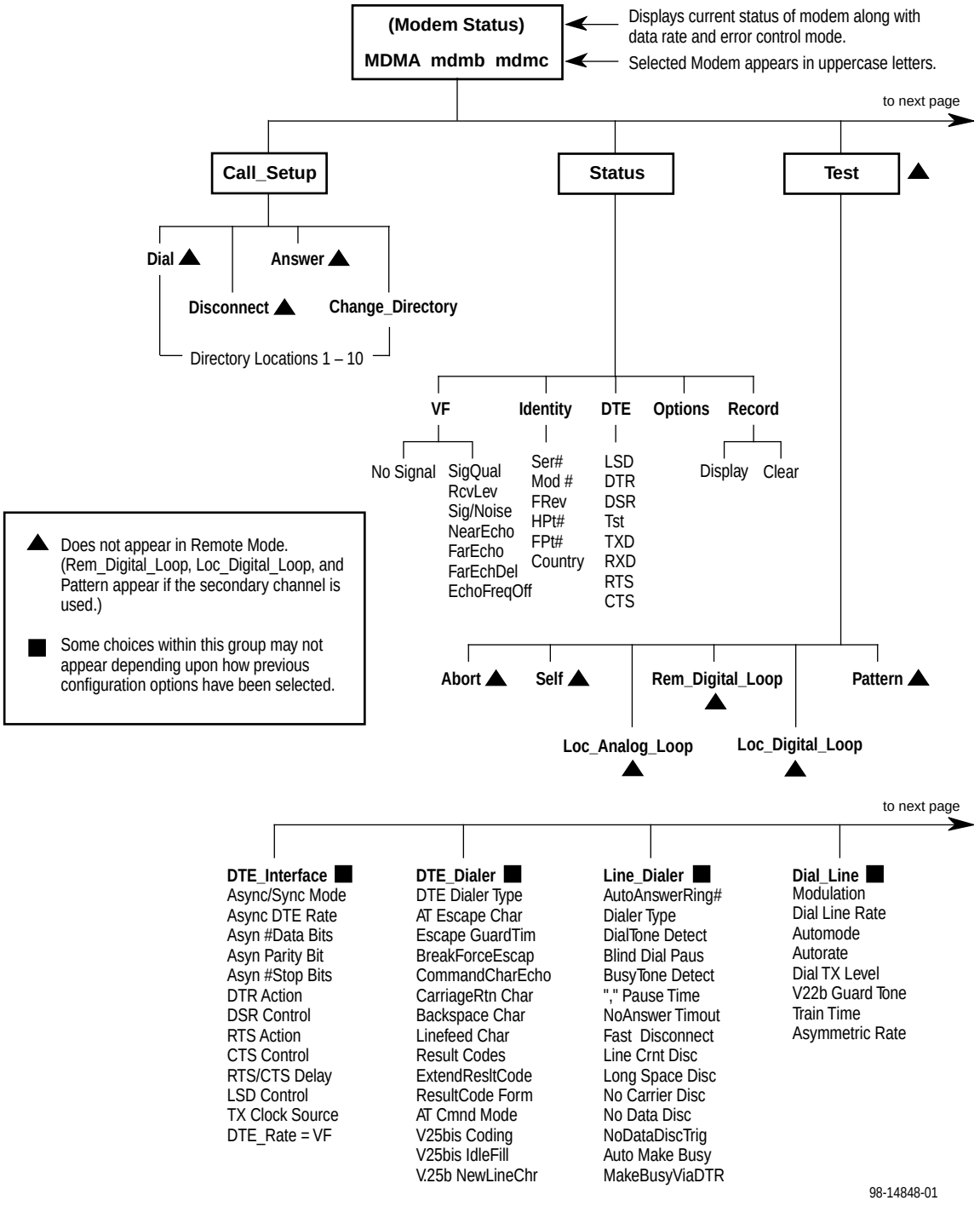
Originate_Secur: No_OrigSec **Nxt No_OrigSec Ena_Orig_Sec**
Originate Security Mode. This configuration option is read-only and cannot be changed from the Configure branch; it can be changed only with an AT command. This configuration option enables or disables security protection used for outbound calls when using the AT command autodialer function.
CallBack_Secur: Disable **End Disable Enable**
Callback Security. This configuration option is read-only and cannot be changed from the Configure branch; it can be changed only with an AT command. This configuration option enables or disables Callback Security. It should be used only if Answer Security is enabled. The factory default is Disable.

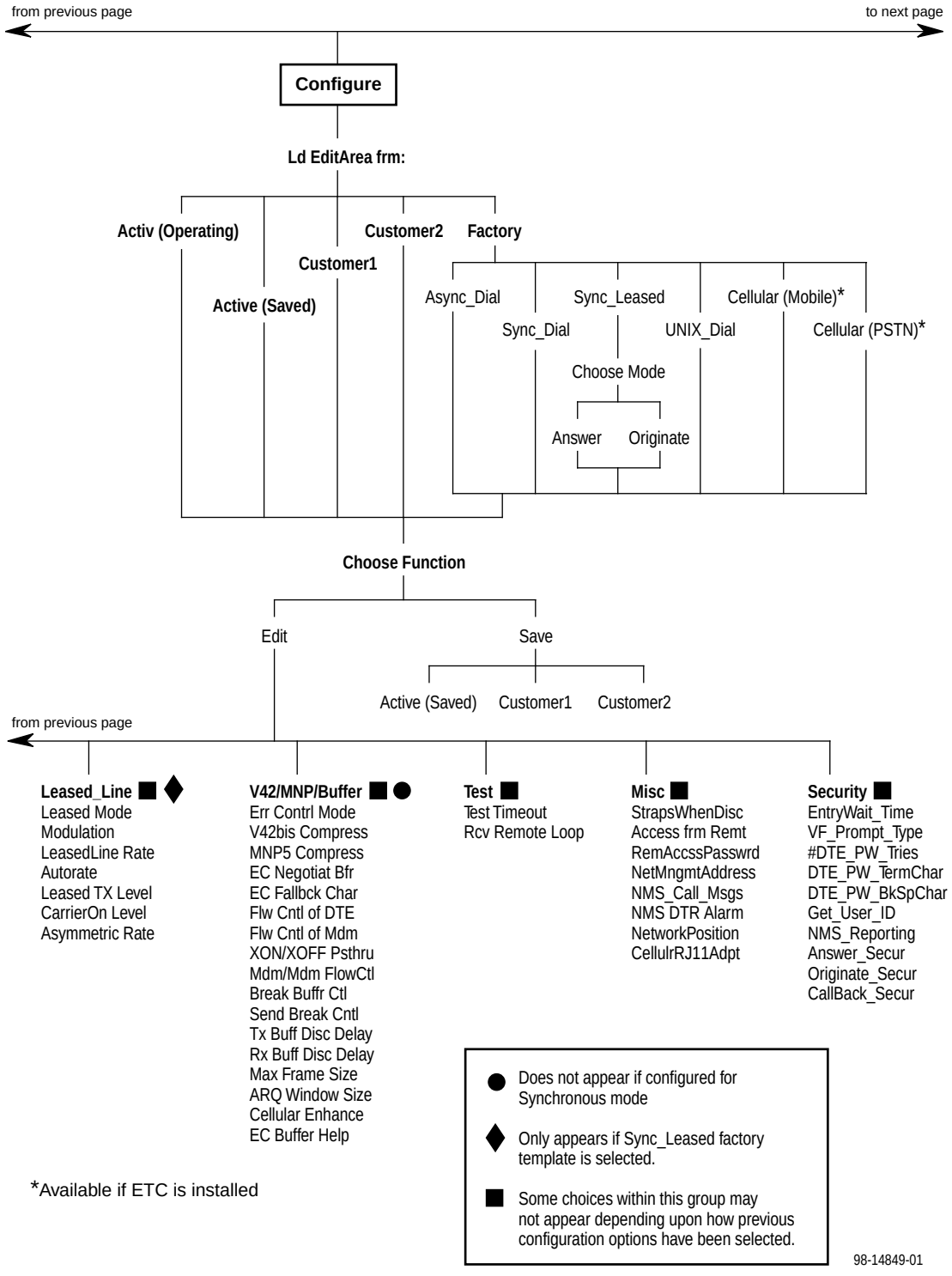
SDCP Menu Tree A

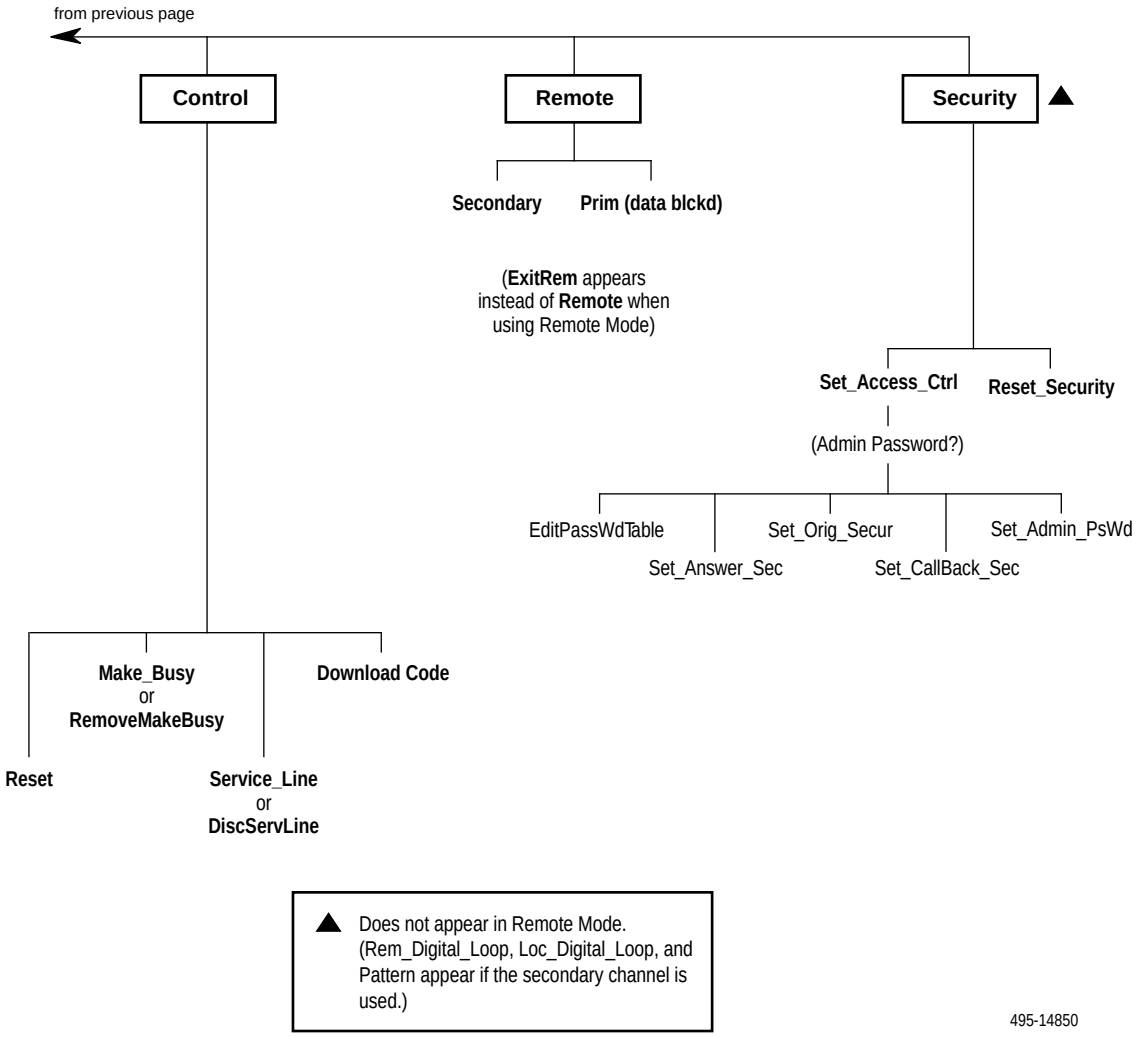
Overview A-1

Overview

The following pages contain graphic representations of the general menu structure of the SDCP displays. The model, installed features, and configuration options all may affect what is actually displayed at each level of the menus.


(Modem Status)
MDMA mdmb mdmc
Displays current status of modem along with data rate and error control mode.
Selected Modem appears in uppercase letters.
to next page
Call_Setup
Status
Test
Dial ▲
Answer ▲
Disconnect ▲
Change_Directory
Directory Locations 1 – 10
VF
Identity
DTE
Options
Record
No Signal
SigQual
RcvLev
Sig/Noise
NearEcho
FarEcho
FarEchDel
EchoFreqOff
Ser#
Mod #
FRev
HPt#
FPt#
Country
LSD
DTR
DSR
Tst
TXD
RXD
RTS
CTS
Display
Clear
▲ Does not appear in Remote Mode. (Rem_Digital_Loop, Loc_Digital_Loop, and Pattern appear if the secondary channel is used.)
■ Some choices within this group may not appear depending upon how previous configuration options have been selected.
Abort ▲
Self ▲
Rem_Digital_Loop ▲
Pattern ▲
Loc_Analog_Loop ▲
Loc_Digital_Loop ▲
to next page
DTE_Interface ■
Async/Sync Mode
Async DTE Rate
Asyn #Data Bits
Asyn Parity Bit
Asyn #Stop Bits
DTR Action
DSR Control
RTS Action
CTS Control
RTS/CTS Delay
LSD Control
TX Clock Source
DTE_Rate = VF
DTE_Dialer ■
DTE Dialer Type
AT Escape Char
Escape GuardTim
BreakForceEscap
CommandCharEcho
CarriageRtn Char
Backspace Char
Linefeed Char
Result Codes
ExtendResltCode
ResultCode Form
AT Cmnd Mode
V25bis Coding
V25bis IdleFill
V.25b NewLineChr
Line_Dialer ■
AutoAnswerRing#
Dialer Type
DialTone Detect
Blind Dial Paus
BusyTone Detect
"," Pause Time
NoAnswer Timout
Fast Disconnect
Line Crnt Disc
Long Space Disc
No Carrier Disc
No Data Disc
NoDataDiscTrig
Auto Make Busy
MakeBusyViaDTR
Dial_Line ■
Modulation
Dial Line Rate
Automode
Autorate
Dial TX Level
V22b Guard Tone
Train Time
Asymmetric Rate
98-14848-01


from previous page
to next page
Configure
Ld EditArea frm:
Activ (Operating)
Customer2
Factory
Customer1
Active (Saved)
Async_Dial
Sync_Leased
Cellular (Mobile)*
Sync_Dial
UNIX_Dial
Cellular (PSTN)*
Choose Mode
Answer
Originate
Choose Function
Edit
Save
Active (Saved)
Customer1
Customer2
from previous page
Leased_Line
Leased Mode
Modulation
LeasedLine Rate
Autorate
Leased TX Level
CarrierOn Level
Asymmetric Rate
V42/MNP/Buffer
Err Contrl Mode
V42bis Compress
MNP5 Compress
EC Negotiat Bfr
EC Fallbck Char
Flw Cntl of DTE
Flw Cntl of Mdm
XON/XOFF Psthru
Mdm/Mdm FlowCtl
Break Buffr Ctl
Send Break Cntl
Tx Buff Disc Delay
Rx Buff Disc Delay
Max Frame Size
ARQ Window Size
Cellular Enhance
EC Buffer Help
Test
Test Timeout
Rcv Remote Loop
Misc
StrapsWhenDisc
Access frm Remt
RemAccssPasswrd
NetMngmtAddress
NMS_Call_Msgs
NMS DTR Alarm
NetworkPosition
CellulrRJ11Adpt
Security
EntryWait_Time
VF_Prompt_Type
#DTE_PW_Tries
DTE_PW_TermChar
DTE_PW_BkSpChar
Get_User_ID
NMS_Reporting
Answer_Secur
Originate_Secur
CallBack_Secur
*Available if ETC is installed
Does not appear if configured for Synchronous mode
Only appears if Sync_Leased factory template is selected.
Some choices within this group may not appear depending upon how previous configuration options have been selected.
98-14849-01


from previous page
Control
Remote
Security ▲
Secondary
Prim (data blckd)
(ExitRem appears instead of Remote when using Remote Mode)
Set_Access_Ctrl
Reset_Security
(Admin Password?)
EditPassWdTable
Set_Orig_Secur
Set_Admin_PsWd
Set_Answer_Sec
Set_CallBack_Sec
Make_Busy or RemoveMakeBusy
Download Code
Reset
Service_Line or DiscServLine
▲ Does not appear in Remote Mode. (Rem_Digital_Loop, Loc_Digital_Loop, and Pattern appear if the secondary channel is used.)
495-14850

Result Codes B

Overview B-1

Overview

Table B-1 lists all the result codes 3821*Plus* modems may send to the DTE. Result codes can be numeric or verbal, terse or extended. See the Q*n*, V*n*, and X*n* commands in Chapter 4 for more information.

Table B-1
(1 of 3)
Result Codes

Numbers (1)	Numbers (2)	Word	Description
0	0	OK	Command executed
1	1	CONNECT	Modem connected to line
2	2	RING	Modem receiving a ring voltage from the VF line
3	3	NO CARRIER	Modem lost or does not detect carrier signal, or does not detect answer tone
4	4	ERROR	Invalid command
5	5	CONNECT 1200*	Connection at 1200 bps
6	6	NO DIALTONE*	No dial tone detected
7	7	BUSY*	Busy or trunk busy signal detected
8	8	NO ANSWER*	No “quiet” answer (@)
10	10	CONNECT 2400*	Connection at 2400 bps
11	11	CONNECT 4800*	Connection at 4800 bps
12	12	CONNECT 9600*	Connection at 9600 bps
13	16	CONNECT 12000*	Connection at 12,000 bps
14	13	CONNECT 14400*	Connection at 14,400 bps

*Appears when the Extended Result Codes configuration option is enabled.

**Appears when the Extended Result Codes configuration option is set for Use_DTE_Rate. This displays the DTE data rate instead of the line rate.

Table B-1
(2 of 3)
Result Codes

Numbers (1)	Numbers (2)	Word	Description
15	14	CONNECT 19200**	Connection at 19,200 bps
16	15	CONNECT 7200*	Connection at 7200 bps
17	17	CONNECT 16800*	Connection at 16,800 bps
19	1	CONNECT 300*	Connection at 300 bps
20	10	CONNECT 2400/ EC***	Connection at 2400 bps with error control
21	11	CONNECT 4800/ EC***	Connection at 4800 bps with error control
22	12	CONNECT 9600/ EC***	Connection at 9600 bps with error control
23	16	CONNECT 12000/ EC***	Connection at 12,000 bps with error control
24	13	CONNECT 14400/ EC***	Connection at 14,400 bps with error control
25	17	CONNECT 16800/ EC***	Connection at 16,800 bps with error control
26	15	CONNECT 7200/ EC***	Connection at 7200 bps with error control
27	5	CONNECT 1200/ EC**	Connection at 1200 bps with error control
28	28	CONNECT 38400**	Connection at 38,400 bps
29	14	CONNECT 19200/ EC***	Connection at 19,200 bps with error control
30	30	CONNECT 57600**	Connection at 57,600 bps
32	32	CONNECT 76800**	Connection at 76,800 bps
34	34	CONNECT 115200**	Connection at 115,200 bps
37	37	CONNECT 21600*	Connection at 21,600 bps
38	38	CONNECT 24000*	Connection at 24,000 bps
39	39	CONNECT 26400*	Connection at 26,400 bps
40	40	CONNECT 28800*	Connection at 28,800 bps
41	41	CONNECT 31200*	Connection at 31,200 bps
42	42	CONNECT 33600*	Connection at 33,600 bps

*Appears when the Extended Result Codes configuration option is enabled.

**Appears when the Extended Result Codes configuration option is set for Use_DTE_Rate. This displays the DTE data rate instead of the line rate.

*** Appears when the Extended Result Codes configuration option is set for Add/EC. If this configuration option is set for Add/V42,MNP, then V42b, V42, MNP5, MNP4, MNP3, MNP2, or NoEC appears. For either suffix type, if the modulation is V.34, /RX=xxxxx/TX=xxxxx is appended showing the VF rates in both directions.

Table B-1
(3 of 3)
Result Codes

Numbers (1)	Numbers (2)	Word	Description
43	43	CONNECT 21600/ EC***	Connection at 21,600 bps with error control
44	44	CONNECT 24000/ EC***	Connection at 24,000 bps with error control
45	45	CONNECT 26400/ EC***	Connection at 26,400 bps with error control
46	46	CONNECT 28800/ EC***	Connection at 28,800 bps with error control
47	47	CONNECT 31200/ EC***	Connection at 31,200 bps with error control
48	48	CONNECT 33600/ EC***	Connection at 33,600 bps with error control
77	77	FORBIDDEN	Forbidden number
78	78	DELAYED	Delayed number

*** Appears when the Extended Result Codes configuration option is set for Add/EC. If this configuration option is set for Add/V42,MNP, then V42b, V42, MNP5, MNP4, MNP3, MNP2, or NoEC appears. For either suffix type, if the modulation is V.34, /RX=xxxxx/TX=xxxxx is appended showing the VF rates in both directions.

Troubleshooting C

Overview C-1
Automatic Firmware Download C-5
Download Failure C-5

Overview

This appendix points out basic problems that can occur when operating a 3821*Plus* modem. Use Tables C-1 through C-6 to check out these problems. If you are having data communication difficulties, such as periodic character loss, random errors, or constant format errors, use the loopback tests associated with the &T command. With these tests you can usually isolate the fault in your system by using the process of elimination. If problems continue to occur, contact your service representative.

If you would like to download the latest 3821*Plus* firmware from the Automatic Firmware Download Center, see the instructions at the end of this chapter. If you would like to copy the software in your modem to a remote 3821*Plus* modem, see the &&P1 command in Chapter 4.

Table C-1
Modem Health

Symptom	Action
Modem did not pass power-up self-test	Contact the Customer Assistance Center (1-800-237-0016).
LEDs do not light	Verify that the modem card is fully seated in its slot. Verify that the power supply for the 3000 Series Carrier is properly installed and is receiving power.
A problem is suspected after the power-up self-test	Perform a self-test using the AT&T9 command. Perform a local analog loopback with a Pattern test. If the modem consistently registers errors, contact the Customer Assistance Center. If the modem passes the above tests and a problem still exists, then the problem is likely not with your modem.

Table C-2
Online Operation

Symptom	Action
Data scrambled or unreadable	Verify that the character format (data bits, parity, and stop bits) is set to the same value in both modems.
Missing data during a transfer	Verify that you are using the same method of flow control for both the modem and the DTE. If using XON/XOFF flow control, verify that the modem's parity matches the DTE's parity.

Table C-3
Leased-Line Operation

Symptom	Action
Modems do not train-up on leased lines	Verify that the correct cabling is used for your application. Refer to Chapter 2 for modem installation instructions. Verify that one modem is configured for Answer mode and the other is configured for Originate mode.

Table C-4
Modem – DTE Connection

Symptom	Action
Modem does not accept or echo back AT commands	Verify that the cable between the Async port of the DTE and the modem is a standard RS-232 cable. If the cable is bad, replace it. (Null modem cables, also known as crossover cables, do not work in this application.) Using the SDCP, reload the Async Dial factory configuration area to guarantee that all configuration options are returned to their proper setting. If an SDCP is not available, use the AT command recovery technique in Chapter 4.
Modem does not accept or echo back AT commands	Make sure that all AT commands are terminated with a carriage return. Verify that the DTE has a valid character format. Valid format consists of 8 data bits with no parity or 7 data bits with even, odd, mark or space parity. Verify that the DTE's data rate is set to a level supported by the modem (115,200 bps–300 bps). If using a PC, verify that the modem is attached to the correct communications port.

Table C-5
(1 of 2)
Modem – VF Connection

Symptom	Action
Modem does not receive a dial tone	Check the VF line connection. Verify dial tone at the source.
Modem does not go off-hook and answer an incoming call	Verify that the Auto-Answer Ring Count configuration option (S-register 0) is set to a value other than 0 (disable). Verify that the DTE is providing DTR to the modem. If the DTE does not provide DTR to the modem, verify that the modem's &D command (DTR Action configuration option) is set for Ignore (&D0). Verify all cabling.
Modem goes off-hook, answers, but does not connect	Perform a Local Analog Loopback test and verify that data entered at the DTE is echoed back to the DTE. Verify that the originating modem is compatible. Verify that originating modem recognizes your modem's answer tone.
Modem goes off-hook, answers, but does not connect (continued)	Verify that originating modem supports your modem's modulation schemes. The 3821*Plus* modem recognizes V.34, V.32*terbo,* V.32bis, V.32, V.22bis, V.22, V.21, Bell 212A, and Bell 103J. It does not support other vendors' proprietary modulation schemes. Use the S41 register to force your modem to operate at the same modulation scheme as the originating modem.
Originate Mode	Verify that the modem's DTE Dialer configuration option is set to the correct setting.
Modem does not go off-hook and begin dialing	If using AT Dialing, refer to the Table C-4, Modem – DTE Connection. If using DTR Dialing, verify the telephone number stored in directory location 1, and verify that the DTE is raising DTR from Off to ON to initiate a dial. If using V.25bis Async, verify that the correct character format is set to 7 data bits with even parity and 1 stop bit, and the carriage return and line feed are used as command terminators. If using V.25bis bisync, verify that the correct character format uses two synchronous control characters and a start-of-text control character before the text block and an end-of-text control character after the text block. If using V.25bis HDLC, verify that the correct character format uses flag, address, and control characters before the text block and a frame sequence check and flag after the text block.
Modem dials but does not connect	If the modem is operating behind a PBX, determine if a 9 and comma are needed before the telephone number. Determine whether Tone or Pulse dialing is needed. Verify if one modem is configured for Error Control or Disconnect and the other modem is configured for no Error Control. Try calling in Buffer mode. If both modems use V.34, V.32bis, or V.32 modulation, set the modem's Train Time configuration option to Long.

Table C-5
(2 of 2)
Modem – VF Connection

Symptom	Action
Intermittent disconnects, high error rates, or excessive retransmissions	Use the AT&T7 command to perform a remote digital loopback test with pattern test.
Modem connects but sends ERROR result code to DTE	Your modem may be configured to use security and you are not supplying the proper passwords. See Chapter 7, *Security*.
Modem establishes and disconnects a call	You may have a poor VF connection. Disconnect and dial again. The remote modem may have encountered an EC Disconnect, where the modem is configured to establish a call using error correction. If the modems cannot negotiate EC, then a disconnect occurs. The remote modem may be in a forced Error Control mode (causing it to disconnect if there is no error control). Reconfigure your modem to V.42/MNP or Buffer and try again. Perform a Local Analog Loopback test to check the modem's hardware operation.
High error rates occur when running a local loopback or self-test.	Incoming rings can cause data errors during a loopback test. If possible, disconnect the VF line, then abort and restart the test.

Table C-6
Fax Operation

Symptom	Action
Modem cannot send or receive a fax	Make sure that your fax software is correctly installed. Check your fax software to see if there is an Answer mode or Receive Fax setting that must be enabled.
Sections of your fax are missing	This often indicates a noisy telephone line or a flow control problem. To resolve the flow control problem, try using hardware flow control (RTS/CTS). This must be enabled in your software (refer to the software's documentation) and set within your modem using the AT&K3 command (RTS/CTS flow control).
Your fax did not complete, and your modem displays result codes in the numeric format	For some reason your modem and software are no longer communicating, and, as a result, your modem is stuck in fax mode. Type ATE1V1 and press Enter. The software should respond with an OK. Try sending or receiving the fax again.

Automatic Firmware Download

New releases may be available for the 3821*Plus* modem. The latest 3821*Plus* firmware is available at no charge from the Automatic Firmware Download Center. Refer to page A in the front of this document for contact information.

Informational messages are displayed on your DTE when the modem is connected. These show the amount of time the download will take.

If the modem connects at 14,400 bps, the download takes about 10 minutes. When the download is complete, the modem resets itself.

Download Failure

If the download is interrupted, the modem is left in a state in which it can only be used to receive a call for a download. The MR/Pwr LED blinks slowly when the modem is in this state, and the modem will not respond to AT commands.

If you are unable to complete the download, call your service representative.

Technical Specifications D

Table D-1
(1 of 2)
Model 3821*Plus* Technical Specifications

Specifications	Description
APPROVALS	Refer to the label on your modem or contact your sales representative.
COMPATIBILITY AND VF DATA RATES	**Dial-Line Modulations** ITU-T V.34 (33,600, 31,200, 28,800, 26,400, 24,000, 21,600, 19,200, 16,800, 14,400, 12,000, 9600, 7200, 4800, 2400 bps) V.32*terbo* (19,200, 16,800 bps) ITU-T V.32bis (14,400, 12,000, 9600, 7200, 4800 bps) ITU-T V.32 (9600, 4800 bps) ITU-T V.22bis (2400 bps) ITU-T V.22 (1200 bps) ITU-T V.21 (300 bps) Bell 212A (1200 bps) Bell 103J (300 bps) **Leased-Line Modulations** ITU-T V.34 (33,600, 31,200, 28,800, 26,400, 24,000, 21,600, 19,200, 16,800, 14,400, 12,000, 9600, 7200, 4800, 2400 bps) V.32*terbo* (19,200, 16,800 bps) ITU-T V.32bis (14,400, 12,000, 9600, 7200, 4800 bps) ITU-T V.32 (9600, 4800 bps) ITU-T V.22bis (2400 bps) **Fax Modulations** ITU-T V.17 (14,400, 12,000, 9600, 7200 bps) ITU-T V.29 (9600, 7200 bps) ITU-T V.27ter (4800, 2400 bps)
DTE RATES	115,200, 76,800, 57,600, 38,400, 28,800, 19,200, 14,400, 12,000, 9600, 7200, 4800, 2400, 1200, 300 bps
ERROR CONTROL	ITU-T V.42 MNP 4–2
DATA COMPRESSION	ITU-T V.42bis MNP Class 5
CELLULAR PROTOCOL	ETC 1.0, ETC 1.1 (If installed)

Table D-1
(2 of 2)
Model 3821*Plus* Technical Specifications

Specifications	Description
ENVIRONMENT	
Operating Temperature	32°F (0°C) to 122°F (50°C)
Relative Humidity	5% to 90% (noncondensing)
Shock and Vibration	Withstands normal shipping
Storage Temperature	–4°F (–20°C) to 158°F (70°C)
DTE INTERFACE	
25-pin D-subminiature connector	EIA-232-E/ITU-T V.24
POWER CONSUMPTION	7.5 watts (typical)
DIMENSIONS (Modem Card)	
Height	7.37 inches (18.7 cm)
Width	1 inch (2.5 cm)
Depth	14.37 inches (36.5 cm)
Weight	1 pound 6 ounces (.62 kg)
TRANSMIT LEVEL	
Dial Line	Permissive (–9 dBm through –32 dBm in 1-dBm increments)
Leased Line	0 through –15 dBm in 1-dBm decrements
VOICE FREQUENCY LINE REQUIREMENTS	2-wire dial (PSTN) or 2-wire leased line
PSTN INTERFACE	RJ21X
PRIVATE LINE INTERFACE	50-pin mass termination

Pin Assignments E

EIA-232-E Pin Assignments E-1
JM8 to RJ11 Crossover Cable E-2
NIM Cable Pin Assignments E-3

EIA-232-E Pin Assignments

Table E-1 lists the EIA-232-E pin assignments for the modem.

Table E-1
EIA-232-E Pin Assignments

EIA-232-E Pin	Name	EIA Circuit	ITU-T	Signal Source	Circuit Function
1	—	AA	101	—	Shield
2	TXD	BA	103	DTE	Transmit Data
3	RXD	BB	104	DCE	Receive Data
4	RTS	CA	105	DTE	Request-to-Send
5	CTS	CB	106	DCE	Clear-to-Send
6	DSR	CC	107	DCE	Data Set Ready
7	SG	AB	102	—	Signal Ground
8	LSD	CF	109	DCE	Line Signal detect
15	TXC	DB	114	DCE	Transmit Clock
17	RXC	DD	115	DCE	Receive Clock
20	DTR	CD	108	DTE	Data Terminal Ready
22	RI	CE	125	DCE	Ring Indicator
24	XTXC	DA	113	DTE	External Clock

JM8 to RJ11 Crossover Cable

For 2-wire leased-line connections to a JM8 network interface, an 8-position to 6-position crossover cable (see Figure E-1) must be used according to the following FCC requirements:

"The RJ series of jacks should not be used for connecting data equipment to nonswitched private line networks – specifically, the service equivalents of the pre-divestiture Series 3002 (Category II, Tariff #260) service. There is a substantial difference in transmit levels permitted in the private line service and those permitted in the public switched network. The industry standard is now an 8-pin keyed modular jack known as the USOC JM8 (Bellcore Technical Reference: TR-EOP-000242, Issue 1, released May 1985.) When ordering the installation of the USOC JM8, specify the appropriate wiring options:

1. 2-wire operations
2. 4-wire operations w/o TEK leads
3. 4-wire operations with TEK leads

TEK leads are for loopback purposes.

A 50-pin version is being considered for multiple line connections."

A JM8 to RJ11 crossover cable may be ordered. See Appendix G, *Equipment List*.

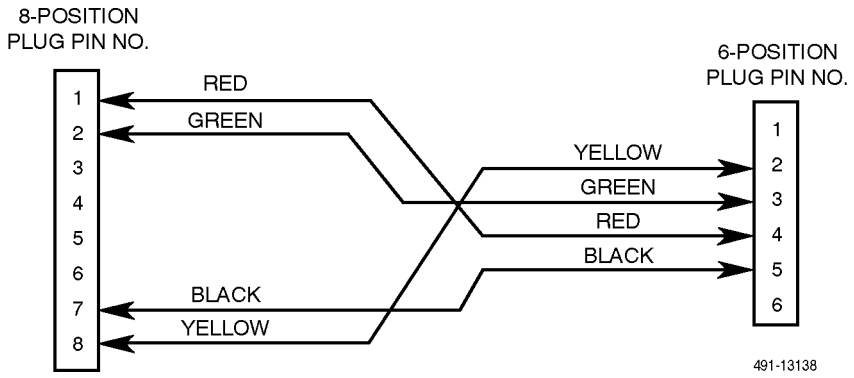


Figure E-1. Wiring Diagram — 8-Position to 6-Position Crossover Cable

NIM Cable Pin Assignments

Table E-2 lists the pin assignments for the 50-pin cable connected to the NIM.

Table E-2
NIM Cable Pin Assignments

Carrier Slot	Modem	Tip	Ring	Pair Colors
1 or 9	A	26	1	White/Blue
	B	34	9	Red/Brown
	C	42	17	Yellow/Orange
2 or 10	A	27	2	White/Orange
	B	35	10	Red/Slate
	C	43	18	Yellow/Green
3 or 11	A	28	3	White/Green
	B	36	11	Black/Blue
	C	44	19	Yellow/Brown
4 or 12	A	29	4	White/Brown
	B	37	12	Black/Orange
	C	45	20	Yellow/Slate
5 or 13	A	30	5	White/Slate
	B	38	13	Black/Green
	C	46	21	Violet/Blue
6 or 14	A	31	6	Red/Blue
	B	39	14	Black/Brown
	C	47	22	Violet/Orange
7 or 15	A	32	7	Red/Orange
	B	40	15	Black/Slate
	C	48	23	Violet/Green
8 or 16	A	33	8	Red/Green
	B	41	16	Yellow/Blue
	C	49	24	Violet/Brown

ITU-T V.25bis Dialing Commands and Responses

F

Overview F-1
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Call Request with Stored Memory Address Provided (CRS) F-2
Call Response F-2
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Incoming Call (INC) F-3
Disregard Incoming Call (DIC) F-3
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Overview

ITU-T V.25bis is an international dialing protocol that permits direct and stored number dialing using DTEs in either Asynchronous, Bisynchronous, or HDLC operating mode. The 3821*Plus* modem supports V.25bis request and answer commands that initiate and cancel dialing, program commands that allow you to create and enter telephone numbers to memory, and list commands that display all telephone numbers stored in directory locations. As commands are entered from the DTE, the 3821*Plus* modem issues a response to the DTE which indicates if the call failed or connected, or if the command is valid or invalid.

The following sections discuss those V.25bis commands supported by the 3821*Plus* modem, and the responses to those commands. Tables F-1 and F-2 in *Command Response* list the V.25bis command and response and the analogous AT command.

NOTE

The 3821*Plus* modem must be configured for V.25bis dialing. Refer to the &M*n* or &Q*n* commands in Chapter 4.

- The character format for Asynchronous Dialing mode is 7 data bits, even parity, and 1 stop bit.
- The character format for Bisynchronous Dialing mode is 7 data bits, odd parity, and 1 stop bit.
- The character format for HDLC Dialing mode can be 8 data bits, no parity, and 1 stop bit; 7 data bits, odd parity, and 1 stop bit; or 7 data bits, even parity, and 1 stop bit.

Character format is determined by the DTE. The modem detects this format when an AT prefix is entered from the DTE.

Call Request Commands

Call Request commands are issued from the DTE to the modem and are responsible for initiating any dial calls. Call Request commands include Call Request with Number Provided (CRN), Call Request with Stored Memory Address Provided (CRS).

Call Request with Number Provided (CRN)

The CRN command dials the telephone number entered from the DTE. CRN is similar to the ATD command.

The CRN command format is:

CRN*n*

Where: *n* is the dial string. The following characters are permitted:

T	DTMF Dialing
P	Pulse Dialing
0–9	DTMF Tones or Pulse Dialed Digits
*** # A B C D**	DTMF Tones
R	Reverse Dial
:	Wait for Dial Tone
, or <	User-Defined Pause
&	Flash Hook
= or >	Delimiters

Call Request with Stored Memory Address Provided (CRS)

The CRS command dials the telephone number stored in the request directory location. CRS is similar to the ATDS command.

The CRS command format is:

CRS*x*

Where: *x* is directory location 1–10.

The modem responds to the command with either a VAL (valid) or INV (invalid) response followed by a call progress report such as connect (CNX) or failure (CFI).

Call Response

A Call Response indicates if the command was accepted by the modem. Call Response includes Call Failure Indication (CFI) and Call Connecting (CNX).

Call Failure Indication (CFI)

The CFI response is issued to the DTE if the modem fails a CRN or CRS command. CFI is similar to the AT result codes BUSY, NO ANSWER, NO CARRIER, NO DIALTONE, and ERROR.

The CFI response format is:

CFI*xx*

Where: *xx* is

ET	Engaged tone
NS	Number not stored
CB	Local DCE busy
RT	Time-out on ring tone
AB	Abort call on time-out
NT	Answer tone not detected
FC	Forbidden call

ET is similar to the Call Failure Messages Busy Signal and Trunk Busy and the result code BUSY.

NS is similar to the Common Operational Message Invalid Number and the result code ERROR.

CB is similar to the Call Failure Messages Dial Line in Use and No Dial-Test and the result code ERROR.

RT is similar to the Call Failure Message No Answer Tone and the result code NO CARRIER.

AB is similar to the Call Failure Messages No Dial Tone and No Dial-DTR and the result code NO DIALTONE and ERROR.

NT is similar to the Call Failure Message No Quiet Answer and the result code NO ANSWER.

Delayed Call Indication (DLC)

The DLC response is issued to the DTE if the modem is not currently allowed to call the number. DLC is similar to the AT result code DELAYED.

The DLC response format is:

DLC*xx*

Where: *xx* is the delay before the number may be called, in minutes.

Call Connecting (CNX)

The CNX response informs the DTE that the modem has connected to the remote modem. CNX is similar to the AT result code CONNECT.

The CNX response format is CNX.

Call Answer Commands

Call Answer commands disable or enable the modem's AutoAnswer function. These commands are issued from the DTE. Call Answer commands include Incoming Call (INC), Disregard Incoming Call (DIC) and Connect Incoming Call (CIC).

Incoming Call (INC)

The INC response informs the DTE that the modem has detected a ring tone. At this point, the DTE can issue the DIC command to disable the modem from answering the call. INC is similar to the AT result code RING.

Disregard Incoming Call (DIC)

The DIC command prevents the modem from answering an incoming call. This command is only valid once the DTE receives an incoming call (INC) response from the modem. A DIC must be issued within 5 seconds after receiving an INC.

The DIC command format is DIC.

If DIC is issued within 5 seconds, the modem sends the VAL response to the DTE. If DIC is issued after 5 seconds, INV is returned.

Connect Incoming Call (CIC)

The CIC command forces the modem to cancel any DIC commands and answer an incoming call. This command is only valid when the DTE issues a DIC command. CIC must be issued within 10 seconds after sending a DIC. CIC is similar to the ATA command.

The CIC command format is CIC.

If CIC is issued within 10 seconds, the modem sends the VAL response to the DTE. If CIC is issued after 10 seconds, INV is returned.

Program Normal (PRN)

The Program Normal (PRN) command allows the DTE to enter and store a telephone number to a specific directory location. PRN is similar to the AT&Z command.

The PRN command format is:

PRN*x;n*

Where: *x* is the directory location 1–10;
n is the telephone number.

Request List of Stored Numbers (RLN)

The Request List of Stored Numbers (RLN) command displays telephone numbers stored in the modem's directory location. If the RLN command is entered without specifying a directory location, then all directory locations and telephone numbers are displayed. If a directory location is entered, then only that telephone number is displayed.

The RLN command format is:

RLN

which displays all directory locations, or:

RLN*x*

Where: *x* is a directory location.

List Stored Number Response (LSN)

LSN is a response to an RLN command issued by the DTE. If a directory location is specified, then the telephone number for that location is displayed. If no directory location is specified, then all telephone numbers stored in memory are displayed.

The LSN response format is:

LSN*x;n*

Where: *x* is the directory location;
n is the telephone number.

Command Response

A Command Response indicates that the command entered was a valid or invalid entry. Command Response includes Valid (VAL) and Invalid (INV).

Valid (VAL)

The VAL response indicates that the modem has accepted the V.25bis command issued by the DTE. VAL is similar to the AT result code OK.

Invalid (INV)

The INV response indicates that the modem has received an incorrect V.25bis command from the DTE. INV is similar to the AT result code ERROR.

The INV response format is:

INV*xx*

Where: *xx* is

CU	command unknown
MS	message syntax error
PS	parameter syntax error
PV	parameter value error

Table F-1 lists V.25bis commands supported by the 3821*Plus* modem.

Table F-1
V.25bis Commands

V.25bis Command	Description	AT Command/S-Register Equivalent
CALL REQUEST COMMANDS		
CRN	Call Request with Number Provided	ATD
CRS	Call Request with Memory Address	ATDS
CALL ANSWER COMMANDS		
INC	Incoming Call Indication	RING
DIC	Disregard Incoming Call	NONE
CIC	Connect Incoming Call	ATA
PROGRAM COMMAND		
PRN	Program Normal	AT&Z
LIST REQUEST		
RLN	Request to List Stored Number	NONE

Table F-2 lists V.25bis response messages supported by the 3821*Plus* modem.

Table F-2
V.25bis Response Messages

V.25bis Command	Description	AT Command/Result Code Equivalent
CALL RESPONSE		
CFI	Call Failure Indication	BUSY, NO ANSWER, NO CARRIER, NO DIAL TONE, ERROR
CNX	Call Connecting Indication	CONNECT
LIST RESPONSE		
LSN	List Stored Number	NONE
COMMAND RESPONSE		
VAL	Valid Command	OK
INV	Invalid Command	ERROR

Equipment List G

Equipment	Order Number	Part Number
3821*Plus* Modem Card (three modems per card)	3821-B1-001	—
NIM with Make Busy and Service Line Features	3000-F1-027	—
NIM without Make Busy and Service Line Features	3000-F1-028	—
DTE Interface Assembly (8-slot, 24-port)	3821-F1-001	—
Optional Equipment:		
DTE Interface Assembly (2-slot, 6-port)	3821-F1-002	—
66A Punchdown Block	25868	—
Male DB25 to 8-Pin Modular Adapter	3821-F1-510	002-0050-0031
Female DB25 to 8-Pin Modular Adapter	3821-F1-511	002-0051-0031
8-Pin Modular to 8-Pin Modular Cable, 5-foot	4400-F1-541	035-0116-0231
8-Pin Modular to 8-Pin Modular Cable, 14-foot	4400-F1-543	035-0116-1431
8-Pin Modular to 8-Pin Modular Cable, 25-foot	4400-F1-544	035-0116-2531
JM8 to RJ11 Crossover Cable	3000-F1-006	—

Country-Specific Configuration Options H

Configuration Options by Country Code H-1

Configuration Options by Country Code

Tables H-1 and H-2 show configuration options whose validity or default values vary according to country code. The abbreviations used in the table are:

- V for Valid
- I for Invalid
- F for Factory Default

Reference to particular country codes in this guide is not an assurance that the modem has been approved for use in that country. Consult your sales representative.

Each modem is shipped from the factory with a specific country code. The ability to change the country code is not accessible to the user.

If the modem is approved for use in the country, configuration options for the North America country code (shown in Table H-2) are valid in:

- Argentina
- Bahamas
- Bermuda
- Bolivia
- Brazil
- Brunei
- Canada
- Chile
- China
- Colombia
- Costa Rica
- Dominican Republic
- Ecuador
- Guatemala
- Hong Kong
- India
- Indonesia
- Korea
- Kuwait
- Malaysia
- Mexico
- Paraguay
- Peru
- Philippines
- Poland
- Saudi Arabia
- Taiwan
- Thailand
- United States
- Uruguay
- Venezuela

Table H-1
(1 of 5)
Configuration Options by Country (A through M)

Strap Description	DCP Choice	AT Command	Australia	Austria	Belgium	Cyprus	Czechia	Denmark	Eire	Finland	France	Germany	Israel	Italy	Japan
DTR Action (&D*n*)	Ignore	&D0	F	I	F	F	F	F	F	F	F	F	F	F	F
	Stndrd_RS232	&D1, &D2	V	F	V	V	V	V	V	V	V	V	V	V	V
	ContrlsOnHook	&D4	V	I	V	V	V	V	V	V	V	V	V	V	V
	DTR_Tx_Mute	&D5	V	I	V	V	V	V	V	V	V	V	V	V	V
Auto Answer Ring Number (S0)	Disable	S0=0	V	V	V	V	V	V	V	V	V	V	V	V	V
	1	S0=1	F	F	I	I	F	F	F	F	I	F	F	F	F
	2	S0=2	V	V	F	F	V	V	V	V	F	V	V	V	V
	—	S0=3	V	V	V	V	V	V	V	V	I	V	V	V	V
	4	S0=4	V	V	V	V	V	V	V	V	I	V	V	V	V
	6	S0=6	V	I	I	I	V	V	V	V	I	V	V	I	V
	8	S0=8	V	I	I	I	V	V	V	V	I	V	V	I	V
	10	S0=10	V	I	I	I	I	V	V	V	I	I	V	I	V
Dialer Type	Tone	T	F	F	F	F	F	F	F	F	F	F	F	F	F
	Pulse	P	V	V	V	V	V	I	V	V	V	V	V	V	V
Dial Tone Detect (X*n*)	Enable	X2, X4, X5, X6	F	F	F	F	F	F	F	F	F	F	F	F	F
	Disable	X0, X1, X3	V	V	I	I	V	I	I	V	I	V	V	V	V
Blind Dial Pause (S6)	2 sec	S6=2	F	F	F	F	I	F	F	F	F	I	I	I	I
	—	S6=3	V	V	V	V	F	V	V	V	V	F	I	I	I
	4 sec	S6=4	V	V	V	V	V	V	V	V	V	V	F	F	F
	6 sec	S6=6	I	V	V	V	V	V	V	V	V	V	V	V	V
	8 sec	S6=8	I	V	V	V	V	V	V	V	V	V	V	V	V
	10 sec	S6=10	I	V	V	V	I	V	V	V	V	I	I	V	V
	20 sec	S6=20	I	V	V	V	I	V	V	V	V	I	I	I	V

V= Valid
I = Invalid
F= Factory Default

Table H-1
(2 of 5)
Configuration Options by Country (A through M)

Strap Description	DCP Choice	AT Command	Australia	Austria	Belgium	Cyprus	Czechia	Denmark	Eire	Finland	France	Germany	Israel	Italy	Japan
"," Pause Time (S8)	2 sec	S8=2	F	F	F	F	F	F	F	F	F	F	F	F	F
	4 sec to 20 sec	S8=4 to S8=20	V	V	V	V	V	V	V	V	V	V	V	V	V
	—	S8=0	V	V	V	V	V	V	V	V	V	V	V	V	V
No Answer Timeout (S7)	30 sec	S7=30	V	I	I	V	I	I	V	V	I	I	I	I	I
	—	S7=40	V	I	I	V	I	I	F	V	I	I	I	I	I
	45 sec	S7=45	F	I	F	F	I	I	I	F	I	I	I	I	F
	60 sec	S7=60	I	F	V	V	F	F	I	V	I	F	F	F	I
	—	S7=90	I	V	I	V	I	I	I	I	I	I	I	I	I
	120 sec	S7=120	I	I	I	I	I	I	I	I	I	I	I	I	I
	—	S7=135	I	I	I	I	I	I	I	I	F	I	I	I	I
Line Crnt Disc (S65)	Enab (>8 msec)	S65=0	I	I	I	I	I	I	I	I	I	I	I	I	I
	Enab (>90 msec)	S65=1	F	F	F	F	F	F	F	F	I	F	F	F	F
	Disable	S65=2	V	V	V	V	V	V	V	V	F	V	V	V	V
No Carrier Disc (S10)	2 sec	S10=20	F	F	F	F	F	F	F	F	F	F	F	F	F
	5 sec	S10=50	V	V	V	V	V	V	V	V	V	V	V	V	V
	10 sec	S10=100	V	V	V	V	V	V	V	V	V	V	V	V	V
	20 sec	S10=200	V	V	I	V	I	I	V	V	V	I	V	V	V
	Disable	S10=255	V	I	I	I	I	I	I	I	I	I	V	I	V

V= Valid
I = Invalid
F= Factory Default

Table H-1
(3 of 5)
Configuration Options by Country (A through M)

Strap Description	DCP Choice	AT Command	Australia	Austria	Belgium	Cyprus	Czechia	Denmark	Eire	Finland	France	Germany	Israel	Italy	Japan
No Data Disc (\T*n*)	—	\T2	V	V	V	V	V	F	V	V	V	V	V	V	V
	—	\T3	V	F	V	V	V	V	V	V	F	F	V	V	V
	10 min	\T10	V	V	V	V	V	V	V	V	V	V	V	V	V
	30 min	\T30	V	V	V	V	V	V	V	V	V	V	V	V	V
	60 min	\T60	V	V	V	V	V	V	V	V	V	V	V	V	V
	Disable	\T0	F	V	F	F	F	V	F	F	V	V	F	F	F

V= Valid
I = Invalid
F= Factory Default

Table H-1
(4 of 5)
Configuration Options by Country (A through M)

Strap Description	DCP Choice	AT Command	Australia	Austria	Belgium	Cyprus	Czechia	Denmark	Eire	Finland	France	Germany	Israel	Italy	Japan
Dial TX Level (&I*n*, &J*n*)	PERMISSV (–9)	&J0	I	I	I	I	I	I	I	I	I	I	I	I	I
	0 dBm	&I0	I	I	I	I	I	I	I	I	I	I	I	I	I
	–1 to –4 dBm	&I1 to &I4	V	I	V	V	V	V	V	V	I	V	V	V	V
	–5 dBm	&I5	V	I	V	V	V	V	V	V	I	V	V	F	V
	–6 dBm	&I6	V	I	V	V	V	V	V	V	I	V	V	V	V
	–7 dBm	&I7	V	I	F	V	V	V	F	V	I	V	V	V	V
	–8 dBm	&I8	V	I	V	V	V	V	V	V	V	V	V	V	V
	–9 dBm	&I9	V	F	V	V	V	V	V	V	V	V	V	V	V
	–10 dBm	&I10	F	I	V	F	F	V	V	V	F	F	F	V	V
	–11 dBm	&I11	V	I	V	V	V	F	V	F	V	V	V	V	V
	–12 to –13 dBm	&I12 to &I13	V	I	V	V	V	V	V	V	V	V	V	V	V
	–14 dBm	&I14	V	I	V	V	V	V	V	V	V	V	V	V	V
	–15 dBm	&I15	V	I	V	V	V	V	V	V	V	V	V	V	F
	–16 to –32 dBm	&I16 to &I32	I	I	I	I	I	I	I	I	I	I	I	I	I
	ETC1.0	&I99	I	I	I	I	I	I	I	I	I	I	I	I	I
	ETC1.1	&I100	I	I	I	I	I	I	I	I	I	I	I	I	I
V22b Guard Tone (&G*n*)	Disable	&G0	F	F	I	F	F	F	F	F	I	F	F	F	F
	550Hz	&G1	V	V	I	V	V	V	V	V	I	V	V	V	V
	1800Hz	&G2	V	V	F	V	V	V	V	V	F	V	V	V	V

V= Valid
I = Invalid
F= Factory Default

Table H-1
(5 of 5)
Configuration Options by Country (A through M)

Strap Description	DCP Choice	AT Command	Australia	Austria	Belgium	Cyprus	Czechia	Denmark	Eire	Finland	France	Germany	Israel	Italy	Japan
Leased TX Level (S45)	0 dBm	S45=0	I	I	I	I	I	I	I	I	I	I	I	I	I
	–1 dBm	S45=1	V	I	V	V	V	V	I	V	V	V	V	V	V
	–2 to –5 dBm	S45=2 to S45=5	V	I	V	V	V	V	I	V	V	V	V	V	V
	–6 dBm	S45=6	V	I	V	V	V	V	I	V	V	V	V	V	V
	–7 dBm	S45=7	V	I	F	V	V	V	I	V	V	V	V	V	V
	–8 dBm	S45=8	V	I	V	V	V	V	I	V	V	V	V	F	V
	–9 dBm	S45=9	V	I	V	V	V	V	I	V	V	V	V	V	V
	–10 dBm	S45=10	F	F	V	F	V	V	I	V	V	V	V	V	V
	–11 dBm	S45=11	V	V	V	V	V	F	I	F	V	V	V	V	V
	–12 dBm	S45=12	V	V	V	V	V	V	I	V	F	V	V	V	V
	–13 dBm	S45=13	V	V	V	V	V	V	F	V	V	V	F	V	V
	–14 dBm	S45=14	V	V	V	V	V	V	V	V	V	V	V	V	V
	–15 dBm	S45=15	V	V	V	V	F	V	V	V	V	F	V	V	F
	–16 to –32 dBm	S45=16 to S45=32	I	I	I	I	I	I	I	I	I	I	I	I	I
Carrier On Level (S48)	–43 dBm	S48=0	F	F	F	V	F	F	F	F	V	F	F	F	F
	–33 dBm	S48=2	V	V	V	V	V	V	V	V	V	V	V	V	V
	–26 dBm	S48=1	V	V	V	F	V	V	V	V	F	V	V	V	V

V= Valid
I = Invalid
F= Factory Default

Table H-2
(1 of 5)
Configuration Options by Country (N through Z)

Strap Description	DCP Choice	AT Command	Netherlands	New Zealand	North America	Norway	Portugal	Singapore	South Africa	Spain	Sweden	Switzerland	Thailand	Turkey	United Kingdom
DTR Action (&D*n*)	Ignore	&D0	F	F	F	F	F	F	F	F	F	F	F	F	F
	Stndrd_RS232	&D1, &D2	V	V	V	V	V	V	V	V	V	V	V	V	V
	ContrlsOnHook	&D4	V	V	V	V	V	V	V	V	V	V	V	V	V
	DTR_Tx_Mute	&D5	V	V	V	V	V	V	V	V	V	V	V	V	V
Auto Answer Ring Number (S0)	Disable	S0=0	V	V	V	V	V	V	V	V	V	V	V	V	V
	1	S0=1	F	I	F	F	F	F	F	F	F	I	F	F	F
	2	S0=2	V	F	V	V	V	V	V	I	V	I	V	V	V
	—	S0=3	I	I	V	V	V	V	V	I	V	F	V	V	V
	4	S0=4	I	I	V	V	V	V	V	I	V	I	V	V	V
	6	S0=6	I	I	V	V	V	V	V	I	V	I	V	V	V
	8	S0=8	I	I	V	V	V	V	V	I	V	I	V	V	V
	10	S0=10	I	I	V	I	V	V	V	I	V	I	V	V	V
Dialer Type	Tone	T	F	F	F	F	F	F	F	F	F	F	F	F	F
	Pulse	P	V	V	V	I	V	V	V	V	I	V	V	V	V
Dial Tone Detect (X*n*)	Enable	X2, X4, X5, X6	F	F	F	F	F	F	F	F	F	F	F	F	F
	Disable	X0, X1, X3	I	V	V	I	I	V	V	I	I	I	V	V	V
Blind Dial Pause (S6)	2 sec	S6=2	F	F	F	F	F	F	I	F	F	F	F	I	I
	3 sec	S6=3	V	V	V	V	V	V	I	V	V	V	V	I	I
	4 sec	S6=4	V	V	V	V	V	V	F	V	V	V	V	F	F
	6 sec	S6=6	V	V	V	V	V	V	V	V	V	V	V	V	V
	8 sec	S6=8	V	V	V	V	V	V	V	V	V	V	V	V	V
	10 sec	S6=10	V	V	V	V	V	V	I	V	V	V	V	V	I
	20 sec	S6=20	V	I	V	V	V	V	I	V	V	V	V	V	I

V= Valid
I = Invalid
F= Factory Default

Table H-2
(2 of 5)
Configuration Options by Country (N through Z)

Strap Description	DCP Choice	AT Command	Netherlands	New Zealand	North America	Norway	Portugal	Singapore	South Africa	Spain	Sweden	Switzerland	Thailand	Turkey	United Kingdom
"," Pause Time (S8)	2 sec	S8=2	F	F	F	F	F	F	F	F	I	F	F	F	F
	4 sec to 20 sec	S8=4 to S8=20	V	V	V	V	V	V	V	V	I	V	V	V	V
	—	S8=0	V	V	V	V	V	V	V	V	F	V	V	V	V
No Answer Timeout (S7)	30 sec	S7=30	I	V	V	V	V	V	I	V	V	I	V	V	I
	—	S7=40	I	V	V	V	V	V	I	V	V	I	V	V	I
	45 sec	S7=45	I	F	F	F	F	F	I	F	F	I	F	F	I
	60 sec	S7=60	F	V	V	V	V	V	F	V	V	I	V	V	F
	—	S7=90	I	I	V	V	V	V	I	V	I	F	V	V	I
	120 sec	S7=120	I	I	V	I	I	V	I	I	I	I	V	V	I
	—	S7=135	I	I	V	I	I	V	I	I	I	I	V	V	I
Line Crnt Disc (S65)	Enab (>8 msec)	S65=0	I	I	F	I	I	I	I	I	I	I	F	I	I
	Enab (>90 msec)	S65=1	F	F	V	I	F	F	F	F	F	F	V	F	F
	Disable	S65=2	V	V	V	F	V	V	V	V	V	V	V	V	V
No Carrier Disc (S10)	2 sec	S10=20	F	F	F	F	F	F	F	F	F	F	F	F	F
	5 sec	S10=50	V	V	V	V	V	V	V	V	V	V	V	V	V
	10 sec	S10=100	V	V	V	V	V	V	V	V	V	V	V	V	V
	20 sec	S10=200	V	V	V	V	V	V	V	V	V	V	V	V	V
	Disable	S10=255	I	V	V	I	I	V	V	I	V	V	V	V	V

V= Valid
I = Invalid
F= Factory Default

Table H-2
(3 of 5)
Configuration Options by Country (N through Z)

Strap Description	DCP Choice	AT Command	Netherlands	New Zealand	North America	Norway	Portugal	Singapore	South Africa	Spain	Sweden	Switzerland	Thailand	Turkey	United Kingdom
No Data Disc (\T*n*)	—	\T2	V	V	V	V	V	V	V	F	V	V	V	V	V
	—	\T3	V	V	V	V	V	V	V	V	V	V	V	V	V
	10 min	\T10	V	V	V	V	V	V	V	V	V	V	V	V	V
	30 min	\T30	V	V	V	V	V	V	V	V	V	V	V	V	V
	60 min	\T60	V	V	V	V	V	V	V	V	V	V	V	V	V
	Disable	\T0	F	F	F	F	F	F	F	V	F	F	F	F	F

V= Valid
I = Invalid
F= Factory Default

Table H-2
(4 of 5)
Configuration Options by Country (N through Z)

Strap Description	DCP Choice	AT Command	Netherlands	New Zealand	North America	Norway	Portugal	Singapore	South Africa	Spain	Sweden	Switzerland	Thailand	Turkey	United Kingdom
Dial TX Level (&I*n*, &J*n*)	PERMISSV (–9)	&J0	I	I	F	I	I	I	I	I	I	I	F	I	I
	0 dBm	&I0	I	I	I	I	I	I	I	I	I	I	I	I	V
	–1 to –4 dBm	&I1 to &I4	V	V	I	V	V	I	I	V	V	V	I	V	V
	–5 dBm	&I5	V	V	I	V	V	I	I	V	V	V	I	V	V
	–6 dBm	&I6	V	V	I	V	V	I	V	V	V	V	I	V	V
	–7 dBm	&I7	V	V	I	V	F	I	V	V	V	V	I	V	V
	–8 dBm	&I8	V	V	I	V	V	I	V	V	V	V	I	V	V
	–9 dBm	&I9	V	V	I	V	V	I	V	V	V	F	I	F	F
	–10 dBm	&I10	F	V	V	F	V	F	F	V	V	V	V	V	V
	–11 dBm	&I11	V	V	V	V	V	V	V	F	V	V	V	V	V
	–12 to –13 dBm	&I12 to &I13	V	V	V	V	V	V	V	V	V	V	V	V	V
	–14 dBm	&I14	V	F	V	V	V	V	V	V	F	V	V	V	V
	–15 dBm	&I15	V	V	V	V	V	V	V	V	V	V	V	V	V
	–16 to –32 dBm	&I16 to &I32	I	I	V	I	I	I	I	I	I	I	V	I	I
	ETC1.0	&I99	I	I	V	I	I	I	I	I	I	I	I	I	I
	ETC1.1	&I100	I	I	V	I	I	I	I	I	I	I	I	I	I
V22b Guard Tone (&G*n*)	Disable	&G0	F	F	F	F	F	F	F	F	F	I	F	F	F
	550Hz	&G1	V	V	V	V	V	V	V	V	V	I	V	V	V
	1800Hz	&G2	V	V	V	V	V	V	V	V	V	F	V	V	V

V= Valid
I = Invalid
F= Factory Default

Table H-2
(5 of 5)
Configuration Options by Country (N through Z)

Strap Description	DCP Choice	AT Command	Netherlands	New Zealand	North America	Norway	Portugal	Singapore	South Africa	Spain	Sweden	Switzerland	Thailand	Turkey	United Kingdom
Leased TX Level (S45)	0 dBm	S45=0	I	I	F	I	I	I	I	I	I	I	F	I	I
	–1 dBm	S45=1	V	V	V	I	V	I	V	V	V	V	V	F	V
	–2 to –5 dBm	S45=2 to S45=5	V	V	V	I	V	I	V	V	V	V	V	V	V
	–6 dBm	S45=6	V	V	V	I	V	I	V	F	V	V	V	V	V
	–7 dBm	S45=7	V	V	V	I	F	F	V	V	V	V	V	V	V
	–8 dBm	S45=8	V	V	V	I	V	V	V	V	V	V	V	V	V
	–9 dBm	S45=9	V	V	V	I	V	V	V	V	V	F	V	V	V
	–10 dBm	S45=10	F	V	V	F	V	V	V	V	F	V	V	V	V
	–11 dBm	S45=11	V	V	V	V	V	V	V	V	V	V	V	V	V
	–12 dBm	S45=12	V	V	V	V	V	V	V	V	V	V	V	V	V
	–13 dBm	S45=13	V	V	V	V	V	V	F	V	V	V	V	V	F
	–14 dBm	S45=14	V	V	V	V	V	V	V	V	V	V	V	V	V
	–15 dBm	S45=15	V	F	V	V	V	V	V	V	V	V	V	V	V
	–16 to –32 dBm	S45=16 to S45=32	I	I	I	I	I	I	I	I	I	I	V	I	I
Carrier On Level (S48)	–43 dBm	S48=0	F	F	F	F	F	F	F	F	F	F	F	F	F
	–33 dBm	S48=2	V	V	V	V	V	V	V	V	V	V	V	V	V
	–26 dBm	S48=1	V	V	V	V	V	V	V	V	V	V	V	V	V

V= Valid
I = Invalid
F= Factory Default

Glossary

Active (Operating) — A configuration area containing configuration options currently in use by the modem. When a power cycle occurs, a reset is performed, or a save is issued, this area is updated with the contents of Active (Saved).

Active (Saved) — A nonvolatile configuration area containing the most recently saved configuration options. Any changes made to configuration options can be saved by issuing an AT&W0 command.

analog loop — Test in which the modem's transmit VF signal is looped to its receiver.

analog signal — A type of signal composed of continuously variable values, used to transmit voice or data over telephone lines.

Answer mode — The state of a modem that it is ready to receive an incoming call. For example, an ATA (Answer) command has been issued to place the modem into online answer mode. The modem has been forced off-hook and is generating an answer tone, beginning the handshaking process with the calling modem.

ASCII — This code (American Standard Code for Information Interchange) is a 7-bit code which establishes compatibility between data services. ASCII is the standard for data transmission over telephone lines. The ASCII code consists of 32 control characters (nondisplayed) and 96 displayed characters.

asymmetric rate — In V.34, the ability of a device to transmit at a different rate than it receives.

Async Dial — A factory preset configuration area containing the configuration options most often used in asynchronous dial networks.

asynchronous transmission — A data transmission that is synchronized by a transmission start bit at the beginning of a character (five to eight bits) and one or more stop bits at the end.

AT command set — A group of commands, issued from an asynchronous DTE, that allow control of the modem while in Command mode. All commands must begin with the characters AT and end with a carriage return.

AT prefix — A prefix issued before every AT command (except A/ and +++) which identifies the DTE's data rate, parity, and character length.

autobaud — To automatically determine the asynchronous DTE data rate.

automatic answer	A capability to respond to a call received over a dial line.
automode	To change modulations or rates within a modulation when modems first connect. A modem may automode to a different modulation than what it is configured for due to the limitations of the remote modem, or automode to a lower rate due to unfavorable VF line conditions during connection.
autorate	To adjust to varying VF line conditions by changing the data rate to a higher or lower rate after connection. The lowest rate the modem autorates to is 4800 bps; the highest possible rate depends on the modulation the modems connected with. In V.34, the modems may autorate asymmetrically.
baud	A unit of signaling speed that is equal to the number of symbols per second. This is not necessarily the same as bits per second, although the terms are frequently interchanged.
Bisync	Binary Synchronous Communications. An IBM communications protocol that has become an industry standard. It uses a defined set of control characters and control character sequences for synchronized transmission of binary-coded data between stations in a data communications system.
bit	A contraction of binary digit. A bit, which is the smallest unit of information, represents a one or a zero (sometimes called mark or space).
bps	Bits per second. Indicates the speed at which bits are transmitted across a data connection.
buffer	A storage device used to compensate for differences in the data flow rate when transmitting data from one device to another.
byte	A sequence of successive bits (usually eight) handled as a unit in data transmission.
CCITT	An advisory committee (Consultative Committee on International Telephone and Telegraph) established by the United Nations to recommend communications standards and policies. Now called ITU-T.
character	A letter, figure, number, punctuation, or other symbols.
character echo	A way to check the accuracy of data transmission by sending (displaying) all the characters being transmitted to the monitor.
Class 1 fax	A fax modem standard. Under Class 1 computer software handles most of the protocol, compression, and conversion tasks.
Class 2 fax	A fax modem standard. Under Class 2 the modem handles most of the protocol, compression, and conversion tasks as well as modulation, leaving the computer free for other work.
command line	Contains the command(s) instructing the modem to perform a function. Command lines begin with the AT prefix (unless disabled), and are executed when you press the Return key.
Command mode	One of two general modem operating modes. When in Command mode, the modem accepts commands instead of transmitting or receiving data.

configuration option Modem software that sets specific operating parameters for the modem. Sometimes referred to as straps.

connector An outlet on equipment and cables that provides a connection.

CSA Canadian Standards Association.

CTS Clear to Send. A signal indicating that the modem is ready for the DTE to transmit data.

Customer 1 A user-defined configuration area containing customized configuration options for a specific application.

Customer 2 A user-defined configuration area containing customized configuration options for a specific application.

data bank An area within the modem used to store the modem's firmware.

data carrier A continuous frequency signal that can be modulated by another signal that contains information to be transmitted.

data compression The elimination of empty fields, redundancies, and gaps in order to reduce storage capacity needs and the amount of data to be transmitted. Anything that is eliminated is restored after the data is received.

Data mode One of two general modem operating modes. When in Data mode, the modem transmits and receives data instead of accepting commands.

DB-25 connector A 25-pin connector that is used to connect a cable which enables communications between two devices.

dBm A decibel referenced to one milliwatt into 600 ohms. This unit measures relative signal power.

DCE The equipment (Data Communications Equipment or Data Circuit Terminating Equipment) that provides the functions required to establish, maintain, and end a connection. This equipment also provides the signal conversion required for communication between the DTE and the telephone line. A modem is a DCE.

DCP Diagnostic Control Panel. The front panel of standalone modems such as the 3825*Plus*. The DCP permits control and configuration of local and remote modems.

demodulation The process of recovering data from a modulated carrier wave.

dial command modifiers A modifier used in the dial string that instructs the modem how to process a dialed telephone number.

dial line A communications circuit that is established by a switched circuit connection in the dial network.

dial network See PSTN.

dial string A series of characters that consists of numbers and modifiers used to dial a telephone number.

digital signal A signal composed of only two discrete values, representing the binary digits 0 and 1.

directory location	Nonvolatile memory that stores up to ten telephone numbers. Each directory location can have up to 40 characters entered.
DOC	Canadian Department of Communication.
download	A process that transfers modem firmware from a locally attached PC to a modem or allows the cloning of firmware from a local modem to a remote modem. Also, the process of moving data from a host computer to an attached computer.
DTE	Data Terminal Equipment. The equipment, such as a computer or terminal, that provides data in the form of digital signals.
DTMF	Dual Tone Multi-Frequency. DTMF tones are the sounds produced by pressing the keys of a Touch Tone phone, or by dialing a number with a modem using the ATDT*n* command.
EIA	Electronic Industries Association. This organization provides standards for the data communications industry.
EIA-232-E	An Electronic Industries Association's standard defining the 25-position interface between data terminal equipment and data communications equipment.
EIA RS-366-A	An Electronic Industries Association's standard defining the 25-position interface between data terminal equipment and data communications automatic calling equipment.
EPROM	Erasable programmable read-only memory.
error control	An algorithm used to correct data transmission errors.
escape sequence	Default setting is +++. This sequence lets you switch your modem from Data mode to Command mode.
ETC	Enhanced Throughput Cellular. A proprietary analog cellular transmission protocol.
extended result codes	An asynchronous message (in either numbers or words) that includes VF data rate and error control information the modem sends to the DTE after executing or trying to execute a command.
fax modem	A modem capable of emulating some features of a fax machine. Working under the control of fax software, a fax modem can communicate with a fax machine or with another fax modem.
fax software	A program or system of programs installed on a computer that allow a fax modem to send and receive facsimile images.
FCC	Federal Communications Commission. Board of Commissioners that regulates all interstate and foreign electrical communication systems that originate from the United States.
full-duplex	Simultaneous, two-way communications.
Group III	A fax standard that specifies a rate of transmission of about one page per minute.
half-duplex	Two-way data communications allowed in only one direction at a time.

handshaking	The exchange of predetermined codes and signals (tones) to establish a connection between two modems.
HDLC	High-level Data Link Control. A communications protocol defined by ISO.
host	A computer attached to a network that shares its information and devices with the rest of the network.
Hz	A unit of frequency (hertz) that equals one cycle per second.
ISO	International Organization for Standardization.
ITU-T	The Telecommunications Standardization Sector of the International Telecommunications Union, an advisory committee established by the United Nations to recommend communications standards and policies. Before March 1993 it was called CCITT.
JM8	A jack used for leased-line networks. Pins 1 and 2 are the transmit pair and Pins 7 and 8 are the receive pair.
LCD	Liquid Crystal Display. The device that permits text to be displayed on the DCP or SDCP.
leased line	A private line connection exclusively for the user. No dialing is necessary.
LED	Light-Emitting Diode. A light or status indicator on the DCP or SDCP that glows in response to the presence of a certain condition (e.g., Alrm).
local analog loopback	Test in which the modem's transmit VF signal is looped to its receiver.
long space disconnect	A disconnect can occur if the modem receives an extended space from a remote modem; for example, when a remote modem is commanded to disconnect, it transmits a continuous space to the modem before disconnecting.
loopback test	Any test that verifies a device's integrity by connecting the device's output of one direction to the device's input of the other direction, then checking the received signal for errors.
LSD	Line Signal Detect. A signal between the DTE and modem indicating energy exists on the transmission circuit.
MNP	This protocol (Microcom Networking Protocol) detects and corrects data errors caused by telephone line noise and signal distortion. MNP5 includes data compression.
modem	MOdulator/DEModulator. A device that transforms signals from digital to analog form and vice versa.
modulation	The process of varying some characteristics (usually amplitude, frequency, and/or phase) of a carrier wave to form data transmissions.
off-hook	The state of a telephone or modem that is being used.
on-hook	The state of a telephone or modem that is not being used.

Originate mode	The state of a modem ready to transmit a call. In a dial network, it is the modem that makes the call. In a leased-line network, it is one of two sides of the network that is selected to be the originating modem.
parity	A way of checking data accuracy by counting the number of bits that have a value of one.
PBX	Telephone switching equipment (Private Branch Exchange) dedicated to one customer. A PBX connects private telephones to each other and to the public dial network.
permissive interface	A dial modem operating mode characterized by a fixed output power level of –9 dBm. It is one of two possible modes of operation for modems connected to dial lines (see programmable interface).
power-up self-test	A test that checks most hardware components when the modem is powered-on.
product code	A three-digit code indicating the modem's highest VF data rate.
programmable interface	A dial modem operating mode characterized by an output power level (–12 to 0 dBm) set by a programming resistor in the jack. It is one of two possible modes of operation for modems connected to dial lines (see permissive interface).
protocol	The rules for timing, format, error control, and flow control during data transmission.
PSTN	Public Switched Telephone Network. A network shared among many users who can use telephones to establish connections between two points. Also known as dial network.
pulse dialing	One of two dialing methods, in which telephone numbers are sent as pulses (brief changes in voltage or current intensity) across the telephone line. Rotary telephones use pulse dialing.
register	A part of the modem's memory that contains values that determine the modem's operating characteristics.
remote loopback	A test that sends a signal to the remote modem to test the local modem, the remote modem, and the circuit between them.
result code	An asynchronous message (in either numbers or words) that the modem sends to the DTE after executing or trying to execute a command.
RJ11	A type of 6-position jack normally used with permissive dial networks and telephone sets.
RJ45	A type of 8-position jack normally used with programmable dial networks.
rotary	A TELCO service whereby multiple lines to a customer site share a common telephone number.
SDCP	Shared Diagnostic Control Panel. The feature that allows a number of carrier-mounted devices to be controlled by a single control panel. Installed on one COMSPHERE 3000 Series Carrier, the SDCP permits control and configuration of devices in up to 8 carriers.
serial transmission	A way of transmitting data in which bits are sent sequentially one at a time.

S-registers	Registers that contain information affecting modem operation. S-register commands must be preceded by the AT prefix.
Sync Dial	A factory preset configuration area containing configuration options most often used in synchronous dial networks.
synchronous transmission	Data transmission that is synchronized by timing signals. Characters are sent at a fixed rate. This type of transmission is more efficient than asynchronous transmission.
tone dialing	One of two dialing methods, in which telephone numbers are sent as tones across the telephone lines.
training	A process where two modems try to establish a connection over the VF line.
UL	Underwriter's Laboratories, Inc.
UNIX Dial	A factory preset configuration area containing the configuration options most often used in a UNIX dial network.
USOC	Universal Service Ordering Codes.
V.17	A fax communications standard for modems operating half-duplex with synchronous data at 14,400 bps.
V.22	A standard for modems operation full-duplex with asynchronous or synchronous data at 1200 bps over the dial network (PSTN).
V.22bis	A standard for modems operating full-duplex with asynchronous or synchronous data at 1200 or 2400 bps over the dial network (PSTN).
V.25bis	A dialing protocol that permits direct and stored-number dialing in asynchronous, bisynchronous, or HDLC modes.
V.27ter	A fax communications standard for modems operating half-duplex with synchronous data at 2400 and 4800 bps.
V.29	A fax communications standard for modems operating half-duplex with synchronous data at 7200 and 9600 bps.
V.32	A standard for modems operating full-duplex with asynchronous or synchronous data at 4800 or 9600 bps on switched (dial) or leased telephone lines.
V.32bis	A standard for modems operating full-duplex with asynchronous or synchronous data over dial networks (PSTN) or leased lines at 14,400, 12,000, 9600, 7200, or 4800 bps.
V.32*terbo*	A proprietary standard for modems operating full-duplex with asynchronous or synchronous data over dial networks (PSTN) or leased lines at 19,200 or 16,800 bps. The *terbo* is a pun on turbo and ter; the next iteration of the V.32 recommendation, had one been finalized, would have been V.32ter.
V.34	A standard for modems operating full-duplex with asynchronous or synchronous data over dial networks (PSTN) or two-wire leased lines at 33,600, 31,200, 28,800, 26,400, 24,000, 21,600, 19,200, 16,800, 14,400, 12,000, 9600, 7200, 4800, or 2400 bps.
V.42	ITU-T standard for error control protocol.

V.42bis	ITU-T standard for data compression.
V.54	ITU-T standard for local and remote diagnostic loopback tests.
VF	Voice Frequency. The part of the audio frequency range used to transmit voice sound (usually 300 Hz to 3400 Hz). This band is used by the modem for its modulated signal.
XOFF	A character that tells the DTE or modem to stop transmitting data.
XON	A character that tells the DTE or modem to start or resume transmitting data.

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